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Bovine Leptospirosis, a Potential Public Health Problem

Public Relations of the Veterinary Profession

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Vibrionic Abortion

J. E. PRIER,* D.V.M., M.S., Laramie, Wyoming

ABORTION in domestic animals has been attributed to many causes, both non-infectious and infectious. Mechanical injury, faulty nutrition, glandular disorders, and other obscure factors are responsible for non-infectious abortion. Among the infectious causes, organisms of the genus Brucella are most common. In recent years an increasing number of infectious abortions are recognized as being due to *Vibrio fetus*. Probably a large number of reproductive disorders, including abortions and sterility in sheep and cattle, are undiagnosed cases of vibrionic abortion. Difficulties in isolation of the organism and preparation of satisfactory diagnostic antigens have hindered rapid and accurate diagnosis. There are no accurate figures on the economic importance of the disease and an estimation would be pure conjecture. Undoubtedly the actual number of cases far exceeds any statistics obtainable from diagnostic laboratories in the country.

Unlike brucellosis, there is little information concerning the public health significance of the organism. Minor skin infections have been reported to be associated with *Vibrio fetus*[1] but its presence as a primary etiological agent of human disease has not been demonstrated. Curtis[2] reported a similar organism in the uterine discharges of two human patients. Difficulties encountered in the propagation and preservation of *Vibrio fetus* and experimental reproduction of the disease have prevented extensive studies on the therapy and prophylaxis. It has not been demonstrated that animals other than sheep and cattle are susceptible to vibriosis.

History

Vibrionic abortion was first observed in Great Britain[3]. In this report, the authors mentioned a previous outbreak in 1911 in Ireland and Wales, but no authentic report is available[4]. In 1917, the disease was reported in cattle[5] in the United States. Subsequently the disease has been reported from Denmark[6] in calves, Germany[7,8,9,10,11] in cattle and sheep, Japan[12] in cattle, Australia[13] in cattle, and Sweden[14] in cattle and sheep.

In the United States, the disease has been reported from several areas, including New York,[15,16,17,18] Michigan,[19] Montana,[20] California,[4] Illinois,[21] Wyoming,[22,23] and Kansas[24]. Undoubtedly the disease has been identified in many other areas of the country in both sheep and cattle.

Little work was done from the period of initial discoveries (1912-1920) until the late 1930's. As late as 1940 it was mentioned that abortion in sheep was not commonly recognized as due to *Vibrio fetus* infection[19]. Since then, the disease has steadily increased in prominence until it is presently recognized as a major factor in reproductive disorders of both cattle and sheep.

Characteristics of *Vibrio Fetus*

The organism in freshly isolated cultures appears as a comma-shaped or slightly curved rod[4]. It is motile by means of a single flagellum. Chains may be present giving the appearance of a long spirillum. In most cases, the organism stains well with aniline dyes and is characteristically Gram-negative. In old cultures and following the repeated transfer on laboratory media, there is a strong tendency to pleomorphism[24,25].

Filamentous forms and involution forms are sometimes observed. There is also a tendency toward the formation of short rods and occasionally coccus appearing bodies. Barger[4] theorizes that coccoid bodies may constitute a resting stage of the organism. Ryff and Lee[24] described the morphological variation in detail. They isolated an organism with a peculiar ribbon-like shape from the stomach contents of an aborted lamb. This form disappeared or became modified on subculture. The relationship of this variant to pathogenicity or immunity is not known.

The organism is microaerophilic. Primary cultures, therefore, require an atmosphere with an increased carbon dioxide content. In subsequent cultures the organism may eventually become adapted to grow without the partial

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substitution of carbon dioxide. The writer routinely evacuates the anaerobic jar completely and replaces approximately 10% of the volume with carbon dioxide. It has been reported that cultures should be transferred every six days. There is probably better success in transferring every three or four days. If tryptose agar is the medium used, it should be freshly prepared prior to inoculation. Care should be taken to place a heavy amount of inoculum in the water of syneresis and to streak the slant or plate thoroughly and completely. The optimum pH of the organism is 7.0[4].

Media used for the propagation of *Vibrio fetus* varies with different laboratories. Enrichment with body fluids, particularly with serum and whole blood, has been reported to give relatively good growth[4]. In the laboratory of the writer a tryptose agar (Difco enriched with 0.05% thiamine hydrochloride) is used routinely. The organism grows in fine, dewdrop-like colonies on the agar surface. In primary isolations, the growth may appear as a misty, moist film on the surface. Growth is particularly heavy along the agar glass junction and in the water of syneresis. A semisolid or slush agar has also been used. Thiol broth[28] produces a relatively heavy growth in the upper third of the tube of media.

Chick embryos have been used for the cultivation of *Vibrio fetus*[27]. It has been found that there is a marked difference in various strains as to their adaptation to chick embryo cultivation, and the embryos are considered an impractical medium for either the isolation or maintenance of the organism.

Resistance of the Organism

Vibrio fetus is extremely sensitive to environmental changes. A temperature of 58 C. will kill it in five minutes. Direct sunlight and chemicals destroy the organism rapidly, and it is very susceptible to drying. Cultures will survive longer at room temperature than at 5 C. The length of survival of most cultures at room temperature is approximately one week.

It has been shown[28] that viability is increased by suspending the organism in heavy mineral oil. The length of viability was increased to about one month. Lyophilization is an efficient method of preservation. At the present time lyophilizing equipment can be constructed that is suitable for a small laboratory. Limited observations[29] indicate that egg yolk will preserve viability for several weeks. The total period has not been determined.

The viability of *Vibrio fetus* has been investigated[29] in hay, soil, and manure. The organism was viable at 6 C. in all three cases for 20 days. At 30 days of incubation, the organism was not viable at 37 C., 20 C., or 6 C. It is of interest that this observation is in contrast to previous work indicating that the organism was viable for longer periods at room temperature than at refrigerator temperature. The epizootiological importance of this factor has been pointed out since most cases of vibrionic abortion occur in Wyoming during the colder months.

Pathogenicity

Vibrio fetus has been reported to be responsible for abortions in both cattle and sheep. Ewes usually abort late in pregnancy and cows may abort early or during the middle of gestation. Plastridge[21] reported that over half of the positively diagnosed cases of vibrionic abortion in cattle occurred during the first half of gestation, and 22% of these between the fifth and sixth months. He suggests that many abortions may occur very early in gestation but remain undetected.

The organism has been isolated from sudden outbreaks of abortion in sheep and cattle. In herds in which such outbreaks occur, they may or may not be repeated in following years. In older cattle, the disease tends to be self-eliminating, but reappears when young stock is introduced[21]. Some workers have reported a low percentage of sterility following vibrionic infection. Graham and Thorp[21] reported on an outbreak of this disease which was repeated two years in succession in the same ewes.

Aborting ewes may contaminate pastures and range land. The organism is eliminated before, during, and after abortion. It has been stated[22] that ewes may become infected by such means from 10 to 21 days following abortion. Apparently the organism persists for this length of time in soil and manure.

Autopsies on aborted lambs have shown the presence of small necrotic areas in the liver and an edematous condition in the muscles. These lesions are not constant. Microorganisms may be isolated from the stomach contents of aborted animals, or from the kidney, liver, and heart blood, or from the uterine exudate and placental membranes. Primary lesions are in the fetal membranes. In severe cases, thick gelatinous material is present in the intercotyledonary spaces. The membranes may be edematous. Lesions are not specific and resemble those associated with brucellosis.

Various attempts have been made to reproduce the symptoms and lesions of vibriosis. Fetal fluids, vaginal discharges, and pure cul-

tures have been used as inocula by intravenous, intraocular, intramuscular, vaginal, and oral routes[23,25]. The results vary, particularly by oral inoculation, in that some animals abort and some carry normal fetuses to term. In aborting animals *Vibrio fetus* has not been consistently isolated. It has been reported[25] that intravenous and oral inoculations of cultures and fetal fluids and vaginal discharges were capable of producing abortion in experimental ewes.

Frequent attempts have been made to infect experimental animals. Graham and Thorp[21] observed the pure cultures would not produce abortion in guinea pigs, rabbits, or sows. Similar results were previously reported for guinea pigs and rabbits[8].

The importance of the male in transmitting the infection is uncertain. Herrick[28] reported that bulls may act as permanent carriers of infection. Sjollma, Stegenga, and Terpstra[26] reported the isolation of *Vibrio fetus* from the semen of two bulls. Unpublished work[20] indicates that the viability of this organism is prolonged by incubation in bull semen.

Diagnosis

The most accurate method of diagnosis, of course, is by isolation of the organism from the aborted fetus or placental membrances. Many attempts have been made to make a diagnosis by use of serological tests. Graham and Thorp[21] reported that one field case of vibrionic infection was positive to the agglutination test. Welch and Marsh[30] reported that three experimentally infected ewes were postive in a dilution of 1:50 following abortion. Lee and Scrivner[22] reported that five out of six experimentally infected ewes showed a positive titer in a dilution of 1:50. Animals showing positive agglutination titers to *Vibrio fetus* apparently rapidly lose such reactions.

Plastridge[27] reported that agglutinins in infected cattle tend to disappear within six months following abortion. In one study, only 37% of 31 cows showed positive titers three months after abortion. At the time of abortion, 87% were postive. Therefore, it is necessary that agglutination tests be run shortly after abortion if satisfactory diagnostic results are to be obtained. All animals reacting to the agglutination test do not necessarily abort. Observations made by Plastridge[20] indicate that only 35% or less of reacting animals may show clinical symptoms of vibriosis.

Several[24,25,30] reported considerable work in the preparation of suitable antigens for the diagnosis of Vibrio infection. A tube agglutination test is commonly used. The following method of antigen preparation is presently recommended: Seed cultures are prepared in thiol medium. A thiol agar (1 liter of thiol medium plus 25 gm. of agar plus 0.05 gm. glutathione) in Kolle flasks is used to propagate the antigen. Four areas in each flask are inoculated from the seed culture. Flasks are then incubated under 10% carbon dioxide tension for 48 hours at 37 C. The areas of growth are then streaked over the entire surface and the flasks are reincubated for 48 hours. The cells are suspended in natural formalized saline and filtered through glass wool. Following high speed centrifugation the cells are resuspended, filtered through glass wool, and stored at refrigerated temperature. The antigen is diluted to a turbidity of approximately 1.5 on the McFarland nephelometer scale immediately prior to use. Serum dilutions of 1:25, 1:50, 1:100, 1:200 are used. The serum antigen mixtures are incubated at 37 C. for 48 hours. The normal agglutination for each antigen prepared must be determined by running the antigen against a minimum of 50 samples. For a positive reaction, the titer of the test serum must be more than twice the normal titer. Some antigens may autoagglutinate and care must be taken to compensate for this factor.

Antibiotic Therapy

Little research has been done concerning the therapy of vibriosis. Ryff and Lee[25] reported that sulfanilamide, sulfathiazole and sulfamerazine did not show *in vitro* activity against *Vibrio fetus*. Haubrich[17] reported that streptomycin given by intrauterine infusion gave encouraging results in the treatment of infected animals. One gram of streptomycin was diluted in 50-100 cc. of sterile water or saline and inoculated through an inseminating tube into the body of the uterus. Roberts, Gilman, and Larsen[16] reported that semen containing 500 units of penicillin, 500 units of streptomycin, and 0.05 gm. of sulfanilamide per cc. did not support growth.

Preliminary work on the *in vitro* activity of several antibiotics has also been reported[29]. Neomycin, chloromycetin, and terramycin have been shown to have a marked antivibrio activity. Penicillin, streptomycin, bacitracin, and aureomycin showed less activity against four strains of *Vibrio fetus* tested.

Prevention and Control

It is difficult to recommend specific preventive measures for vibriosis that might be based

on scientific facts. Undoubtedly the method of entrance of the infection to otherwise clean herds or flocks is by the introduction of infected animals. As these animals abort they probably shed large numbers of Vibrio into the environment. Since the organism has been shown to live in soil and manure for as long as three weeks, it is highly possible that other ewes or cows soon come in contact with the voided bacteria. Though the exact mode of entrance has never been experimentally proved, it seems reasonable to assume that susceptible animals gain the infection by mouth.

Apparently this disease has venereal aspects. Though males may react to the agglutination test, their exact role in the epidemiology of vibriosis is unknown. It is not unreasonable to assume, however, that males may at least occasionally assume the role of mechanical transmitters by breeding infected females and soon after breeding healthy animals.

It is advisable whenever a cow or ewe aborts, and there is a possibility that vibrionic abortion is present, that all healthy animals be removed from the vicinity. If the abortion occurs in a barn, strict measures of disinfection should be instituted.

Use of the agglutination test as a control and eradication method cannot be recommended without reservation. Because of the transient period of positive reaction, many infected animals may go undetected. Also, there may be some doubt as to whether all animals reacting to the test are actually carriers and potential spreaders of infection. It is certainly recommended that animals reacting to the test immediately following abortion be considered as infected and consequently isolated or removed entirely from the herd.

Eradication of vibrionic abortion is a problem of the future. It necessitates a great deal of work on the part of scientific personnel to discover more basic facts concerning its epidemiology and serological or other means of more accurate diagnosis. It also requires the concerted effort of livestock growers, veterinarians, and livestock officials in devising and executing a satisfactory eradication program.

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(*Continued on page* 111)

Effective Mastitis Control

MASTITIS is the most costly disease of dairy cattle today. A survey conducted by the Committee on Cattle Diseases of the U. S. Livestock Sanitary Association revealed the fact that 42 of 45 state officials reporting disease conditions among cattle in their respective states, advised that mastitis led all other diseases to which this class of livestock is subject. In Reprint No. 125, North Dakota Agricultural Experiment Station's *Bimonthly Bulletin* (Sept.-Oct. 1950), it is stated that between 20 and 40% of all milking cows in the United States have some form of the disease. The authors of this article recite experience of a survey in which almost 20% of the milking cows of a given area were producing abnormal milk and twice that percentage suffered some form of mastitis.

The authors of the reprint referred to above divide the disease into two general classifications: noninfectious, produced by injuries; and infectious, due to some form of bacterial invasion; the latter subdivided into the acute and chronic types.

"The major responsibility in controlling mastitis falls on the man with the milk pail." No program of treatment can be expected to accomplish results in reducing incidence without close cooperation of dairymen. All must hew-to-the-line set by control procedures carefully thought out by competent clinicians. There are no magic wands for mastitis control.

The authors of the reprint referred to in the foregoing, outline ten points for effective control.

1. *Find the Affected Cow.* Effective control must be based on a test that will determine the type of bacteria, if any, present. This may be done by frequent application of the Hotis test on quarter samples of milk, repeated until the spread of the disease between animals in the herd appears to have been stopped. After this point has been reached, the interval between tests may be lengthened from every month to every three to six months. Other laboratory procedures may be performed as indicated or as may be desirable, but some laboratory assistance is essential.

2. *Rearrange the Milking Order.* Milking order should include first the young negative cows, as determined by laboratory study, the older negative cows, negative cows with history of previous trouble and, last, the infected cows. Even though some research indicates that it is practically impossible to experimentally transmit mastitis, no satisfactory data is at hand to

Dr. Glenn C. Holm

show that two-, three-, or four-times-a-day exposure over a long period will not "take"; especially when mechanical injuries such as result from overmilking, chilling, bruising, and teat erosion, weaken or predispose the udder to infection. It is just good insurance to leave the carrier until last in the milking string.

3. *Improve Milking Practices.* Under this heading is included washing and massaging the udder with warm water (120 F.) to which calcium hypochlorite (chlorine solution) or other suitable antiseptic has been added. Paper towels are suggested for this purpose because of the difficulty in keeping udder cloths clean and the possibility of spreading infection with improperly laundered towels. Further under this heading, daily use of the strip cup to detect flaky milk and help in stimulation is encouraged, as are rapid and complete milking and other practices recognized as important to proper physiological udder function. Watch the vacuum and the pulsator speed on milking machines and follow the manufacturer's recommendations.

4. *Clean and Sterilize Milking Machines.* To avoid spread of disease between cows, an extra milking machine head, where practical, is

Fig. 2. Collecting a quarter milk sample for bacteriological examination.

recommended. Supplementing this apparatus avoids loss of time and assures the allowance for proper disinfecting time for teat cups. Thorough cleaning and sterilizing methods are salient points emphasized. This is insurance again. Even with once-a-month testing, a few new cases of mastitis will break out well up in the milking string. Then, too, Staphylococcus can always be found on the premises. The greater the mechanical injury, the higher the rate of noninfectious and infectious mastitis in a given herd.

5. *Prevent Udder Injury.* Because injuries result in noninfectious mastitis, attention should be given to size and construction and repair of stalls, door sills, loafing sheds, lots, etc. These facilities may embody practicability and efficiency, yet be comfortable and thus reduce udder injuries. Here the matter of carefulness in milking and the use of the milking machine is included, as is the admonition to avoid rough handling. Dr. Glenn C. Holm, of the North Dakota Agricultural Experiment Station, states that whenever he finds a herd suffering predominantly from Staphylococcus mastitis he can always find some management practices that are weakening udders. These might be either improper stimulation, overmilking, too short stalls, too little bedding, slippery walkways, all of them together, or other poor practices.

6. *Isolate Cows with Swollen, Inflamed or Injured Udders.* Provide a box stall so individuals may be separated from the rest of the herd. The cow having an unusually large udder or one that is swollen and inflamed, is a "set-up" for mastitis infection. Treating such udder as a preventive measure may injure the gland. In the event that the udder is so swollen that infusion is not advisable and if it has been determined by previous herd test that the cow is a carrier, intramuscular injections of penicillin (3,000,000 units) and streptomycin (3 gm.) are recommended to be given daily until the udder can be treated. If tests have shown this cow to be free of mastitis or free from infective mastitis organisms, it is recommended that no treatment be given except that the animal be kept warm and hand-milked frequently.

7. *Improve Calf Breeding Practices.* Prevent spread of infection to heifer calves by keeping the youngsters tied or stanchioned when feeding or until their muzzles and mouths are cleaned of milk.

8. *Close the Herd to Female Replacements as soon as Possible.*

9. *Rely on Treatment Only as an Adjunct to Control Measures.* Herd treatment under any conditions is discouraged. Treatment of lactating cows should be confined only to those exhibiting definite symptoms on which diagnosis has been made by a qualified veterinarian. Treat all infected cows during the dry period, and in the prepartum period or stage, if treatment while the animal was dry was not effective.

10. *Base the Type of Treatment to be Used on the Laboratory Findings.* Select the treatment that is most likely to be effective in consideration of the laboratory findings and the infectious agent that may be involved.

Fig. 3. Palpation of the udder for the detection of indurations. Each quarter was graded for degree of freedom from scar tissue.

Practical Application of Control Measures

The soundness of the recommendations made in the foregoing was demonstrated by one of the authors of the previously referred to reprint, Dr. Glenn C. Holm, member of the staff and professor of veterinary medicine of the North Dakota Agricultural Experiment Station. The report of results has been prepared by Mr. John Burnham, experiment station editor, in an article entitled, College-Cured Mastitis, appearing in the *Bimonthly Bulletin*, North Dakota Agricultural Experiment Station, Fargo, N. Dak., for November-December 1951. The problem herd of Allen D. Meyer, a Guernsey dairyman near Fargo, is cited to demonstrate results possible if strict attention is given to all the points outlined for effective control. In the herd in question, the owner realized that his losses due to mastitis infection were preventing profitable operations. Aside from loss of several cows sold for slaughter because infection appeared incurable, his yearly expenditures for various advertised remedies, including antibiotics, were estimated at approximately $400. a year. In addition, approximately 5 to 10% of the milk produced each day was dumped because of changes in physical character that made it unsalable. Each of the ten steps of the mastitis program were put into operation at this dairy with the full cooperation of the owner, the attending veterinarian, herdsman, milker and others who assisted in the care of this herd.

On the first visit to the herd, Doctor Holm only observed methods used in the milking procedure. A stop watch was employed to register stimulation and milking time. It was noted that the shortest stimulation time on any cow in the milking herd was 2½ minutes and the longest, 4 minutes. Mr. Meyer now keeps the stimulation time at 1 minute, determined to be the most efficacious. Shortest milking time was observed to be 3¾ minutes and the longest, 9¼. Most of the cows were milked in an average of approximately 7 minutes. This was considered to be overmilking and the evidence of such practice was shown by the number of eroded teats. Half of the cows in the milking herd exhibited erosion on one or more teats; a total of 14 teats being involved. Following the shortening of the milking time to 3 to 4 minutes and the stimulation time to 1 minute, there has not been a serious case of erosion since April 7, 1950. The same milking machine has been used throughout the eight months' observation period.

Fig. 5. Machine stripping. Alert attention of the milker is important to assure adequate stripping without injury to udder tissue.

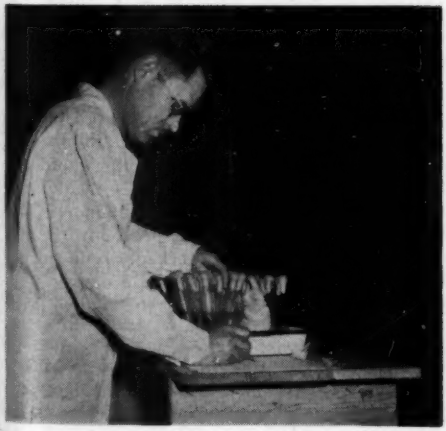

Fig. 4. Barn records are made during milking time. Notations of strip cup results, reaction of milk, and presence of teat erosion are recorded.

In this herd, no drastic changes were made in feeding when cows developed clinical mastitis. Mr. Meyer feeds a 15% protein grain, which is low enough for safety. He did not, nor will he, push his cows. It is considered that he is an intelligent feeder. All calves are now kept in individual pens. Two heifers were infected with *Streptococcus agalactiae* mastitis on freshening. When it was brought to the owner's attention that allowing bucket-fed calves to nurse each other would often produce heifer mastitis, he made necessary alterations in his calf barn to prevent young animals from sucking one another.

The Meyer herd was tested monthly from January 5, 1950 through July 7, 1950 and at three-month intervals until October 10, 1951,

Fig. 6. Cart utilized for transporting scales, chart, pails containing warm solutions for washing udders, and cleaning, disinfecting solutions. Note suspended milking machine head in container on the cart.

when monthly tests were again started because of the establishment of a new herd on the farm.

From January 5, 1950 to July 4, 1950, only one milking cow left the herd; she died of pneumonia. Since that time, several cows have been sold from the original herd. All of these were negative to mastitis. The owner is now assembling a second herd which will be kept separated in a second barn. Prior to the testing and management changes, several animals were sold because of mastitis. A total of 43 milking cows have been tested during the period of observation reported here.

In reference to the treatment given in this herd, it is interesting to note that four cows were treated with an aqueous solution of tyrothricin about two weeks after being dried off.

Fig. 7. Individual calf pens assist in the program for mastitis control.

The product used was ty-sin®. This preparation is used in dry cows and is not milked out. Oily preparations of any kind are not used in any but lactating cows. The four animals referred to were infected at the time they were dried off. Three had severe clinical infections and one an intermittent period of flare-ups prior to the testing program. For the first three months of the testing program, one cow continued as a carrier without a flare-up. She was not treated during this time but two weeks after going dry was given ty-sin by Dr. Robert G. Flickinger, the attending veterinarian who worked in close relationship with Doctor Holm and the owner. Some few animals were treated with penicillin and aureomycin under the direction of the veterinarian. In those udders where it was advisable to inject the recommended tyrothricin solution, the work was carefully done by Doctor Flickinger. In these cases, ty-sin was injected into all quarters, even if only one had been infected. It was found to be better to have all quarters "warm up" or swell a little than to have the owner see one quarter swell alone. The timing for making this injection is important as it is natural to allow some cows that require treatment to approach the springer state before treatment. Treatment of such cows will usually result in lessened milk secretion following lactation.

All cows that had a history of early infection were treated during their dry periods. Freshening heifers with unknown calving history were tested about ten to 14 days before freshening for the presence of viable mastitis bacteria. High leukocyte counts were disregarded. If mastitis bacteria were found, the cows or heifers received daily injections of penicillin. All such cows in this group were infected with *Streptococcus agalactiae*. Treatment was repeated for four days and none was milked out until the cow freshened. The time of treatment was such that the antibiotic and its oily vehicle did not stay in the gland for too long a time. Four cows with positive colostrum were treated in this manner. The secret of the success of this procedure is that if udder bacteria can be markedly reduced before the fresh flow, there is little danger of a severe case developing during the critical postpartum period.

A total of six additional cows were treated for clinical mastitis during their lactation periods in this herd. Three infected with

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Streptococcus agalactiae and Staphylococci mixed infection, received penicillin (100,000 units) twice a day and aureomycin (30 mg.) once a day for four days; the treatments going on simultaneously. One of these three cows was later retreated with penicillin, one with Streptococcus mastitis got the aureomycin treatment and two were treated with penicillin and streptomycin. The infective organism in two cows was Staphylococcus.

In addition to the above cows, there were six that at various times developed noninfectious mastitis. Since these were protected through the milking order and between cow sanitizing of teat cups, no drug treatment was used. Had there been no such protective practices, it would have been advisable to have made those udders bacteriostatic with penicillin, streptomycin, and bacitracin as a precautionary measure providing that they were not so swollen that udder infusion would have been detrimental.

In summarizing results, which were excellent, it must be emphasized that the cooperation of the owner of this herd and the follow-through of the program, step by step, made possible the degree of success attained. Actually, it was possible to free all quarters of a 20-cow-herd from clinical infection as determined by laboratory test results in the short period of eight months. At the beginning of the work, 46.7% of all quarters were positive for mastitis. The savings not only include money previously spent for medication, but also the value of the milk that was dumped because of being abnormal. The biggest saving was increased production. This rose from an average per cow of 375 lb. of butterfat to 485.4 lb. for the 20 milking cows in the herd. In this herd, this increased production amounted to approximately $2,000. worth of additional milk marketed annually.

Mastitis Infection to Record Production

The record of one cow in this herd is an outstanding example of what may be accomplished. Barnes Chief Sally, a Guernsey, produced 411 lb. of butterfat (official record) as a two-year-old, and as a three-year-old, only 420 lb. This cow was in her second and third lactations during the period when Doctor Holm was working with the herd and when mastitis control procedures were put into effect. In her following lactation as a four-year-old, this cow's production jumped from 420 lb. to 846 lb. of butterfat, a world's record for a four-year-old Guernsey. This record increased by ten times the value of this cow, as well as the value of her calves.

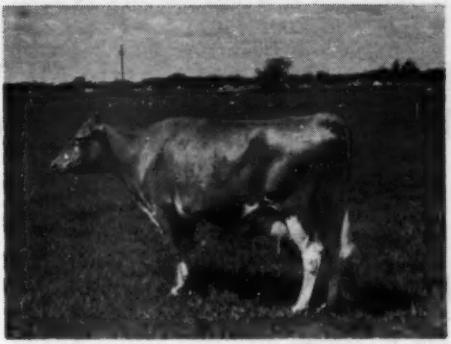

Fig. 8. Barnes' Chief Sally produced 846 lb. of butterfat in a 365-day test as a four-year-old. A Guernsey record. Owned by Allen Meyer, Fargo, N. Dak.

Sally had a *Streptococcus agalactiae* infection in her right front, right rear, and left front quarters. Her leukocyte count on first examination was 1,100,000, 1,200,000, and 800,000, respectively. These pus cell counts were low. Remember, during this period she had no flare-up, but was a carrier. There was teat erosion on all but her right front teat. The strip cup test was negative and the brom cresol purple test was also negative. Subsequent monthly tests were not appreciably different. No blood agar plates nor bacterial counts were made.

In mid-lactation in her record year, Sally's palpation record indicated marked shrinkage in recorded palpable indurations. At this time they were almost imperceptible. The drug used on this cow, which was one of the four referred to earlier, was ty-sin injected two weeks after she was dried off. This was late in March 1950. She freshened July 25, 1950 and finished her record production July 25, 1951. Sally was not treated during the time that she suffered intermittent periods of flare-ups prior to the testing program. She was allowed a resting period of three months and is now in her fifth lactation.

The practicability of this program has thus been indicated on the "laboratory" of a practical farm. In consideration of the cost of medication, of loss of unsalable milk, of decreased production, of cows sacrificed at stockyards, of lower valuation of producing cows and offspring, the owner of the herd under discussion stated that the program as conducted might have cost him $10,000. and still have been within reason.

Doctor Holm stresses that a cow with an udder free from mastitis bacteria when injured

(*Continued on page* 102)

Effects On Beef Cattle Of Prolonged Treatment With A DDT Spray

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DDT is an insecticide of established usefulness in livestock ectoparasite control. Since its introduction several years ago, millions of animals have been treated without observed clinical toxicity. It is known from controlled experiments[1] that DDT is not acutely toxic for most farm animals. There have been reports of suspected DDT poisoning in cattle, based principally on the presence of this insecticide around or on animals showing cryptogenic symptoms. In addition, DDT has unfortunately been accused of causing hyperkeratosis of cattle[2]. Because few, if any, of these reports could be substantiated or discredited, the Bureau of Entomology and Plant Quarantine and the Bureau of Animal Industry undertook, at the Kerrville, Tex., laboratory, an experiment designed to show the toxic effects, if any, of prolonged repeated external applications of DDT to cattle.

Experimental Animals

Eighteen Hereford steers and heifers, ten to 15 months of age at the initiation of the experiment, were selected. Twelve cattle, ten months of age, were known to have had little previous exposure to DDT, a fact proved by chemical analyses of omental fat obtained by laparotomy. Six of these were designated as controls and six were assigned to receive DDT. Six other cattle, 15 months of age, were assigned to receive DDT. These had been sprayed five times at three-week intervals with 0.5% DDT emulsion at the laboratory and had, in addition, been treated an unknown number of times with this insecticide on the ranches from which they were purchased.

Experimental Materials and Mode of Application

For all treatments a concentrate composed, by weight, of 25% of DDT, 65% of xylene, and 10% of triton X-100 was used diluted on a weight/weight basis with ordinary well water to a final concentration of 0.5% DDT. The 12 cattle were sprayed to complete saturation with this emulsion, using a power sprayer developing 200 lb. pump pressure per square inch and equipped with a nozzle delivering a driving spray. The six control cattle received no treatment of any type.

Experimental Procedure

Prior to spraying the unexposed cattle with DDT, biopsy samples of omental fat were obtained from them, at the laboratory. The controls were similarly operated on at the time the experiment was begun. The cattle treated on ranches were subjected to biopsy on arrival at the laboratory before the present experiment was initiated. The biopsies were performed according to the omentectomy technic described by Radeleff[3].

The animals were then sprayed, as described, at two-week intervals for 31 times. Thus, one group of six received a total of 31 applications and another group of six received a total of 36 applications under controlled conditions, plus an unknown number on the ranches.

Omental fat samples were taken from all treated cattle when 28 applications had been made in this experiment (a total of 33 for six of the cattle).

When an additional three applications of spray had been made, a heifer and a steer were slaughtered two weeks after the final spraying, and subjected to detailed examination for gross and microscopic lesions. Twelve weeks later two treated and two control cattle were slaughtered and subjected to a similar detailed examination.

During the entire experiment all 18 cattle were held on pastures as ordinary range animals. During drouth and winter, supplemental feed sufficient for maintenance was given.

Chemical analyses as reported in tables 1 and 2 for the various fats and other tissues were made according to the method described by Schechter, *et al.*[4].

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Clinical examinations and records of weight gains were made throughout the experiment.

Results

There was no clinical evidence of toxic effect due to the DDT treatments and no interference with weight gains. One animal died of an acute hemorrhagic gastroenteritis after 28 applications. The cause was attributed to the eating of frozen vegetation.

Chemical analyses of the tissues of the several cattle are given in tables 1 and 2. The data in table 1 show the plateau beyond which these animals failed to store DDT, the plateau being reached at as low as 76 parts per million and as high as 103 parts per million, but averaging 84 parts per million in one group, 88 parts per million in the other group and 86 parts per million of DDT average for all treated animals. This is adequately demonstrated by the six cattle averaging 45 p.p.m. of DDT before the 31 treatments as opposed to those showing 0.1 p.p.m. at the same time, both groups having essentially the same final values. Particularly interesting are the values for the two cattle having the highest levels before the spraying.

TABLE 1. Parts Per Million of DDT Stored in Fat of Cattle as a Result of Extensive Spray Treatments with 0.5% DDT

	DDT (P.P.M.)			
Animal	Before Trtmt.	After 28 Sprayings	After 33 Sprayings	12 Wk. after Final Spraying
Steer 41	0	82		52**
Steer 37	0	86*		
Steer 36	0.2	80		
Steer 34	0	89		40*
Heifer 33	0.5	Died—see text		
Heifer 32	0	103*		
	0.1 Avg.	88 Avg.		
Steer 38	40		89	
Heifer 35	0.5		84	
Steer 39	37		87	
Steer 40	75		81	
Steer 42	68		87	
Steer 43	48		76	
	45 Avg.		84 Avg.	

*These animals were slaughtered two weeks after three additional treatments. Analyses of their various tissues at that time are given in table 2.

**Fat samples taken at slaughter.

TABLE 2. Analyses of Tissues from Steers Sprayed 31 Times at Two-Week Intervals with 0.5% DDT

	DDT (P.P.M.)	
Tissue	Heifer 32	Steer 37
Bone marrow, yellow	92	90
Body fat	95	102
Omental fat	98	100
Spinal cord	10.4	1.4
Thymus	5.2	—
Heart	—	0.2
Muscle	0.6	0.3
Kidney	—	0.3
Brain	0	0
Liver	0.5	0.3
Spleen	0	0
Adrenals	0	—
Lymph glands	—	1

Results of chemical analyses of fat samples are given in table 1 for all animals except the two that were slaughtered after 31 treatments, these being given in table 2 along with the analyses of other tissues of these two animals. It is significant that, of the edible portions of these animals, only the fat depots and marrow showed a high level of DDT. Of the other tissues analyzed, only the thymus and spinal cord contained more than one part per million of DDT.

Autopsies of the slaughtered cattle revealed no gross lesions. One treated animal possessed an atrophic right kidney with compensatory hypertrophy of the left kidney. This was the only abnormality noted.

Histological examination of the brain, spinal cord, liver, kidney, spleen, thyroid, pancreas, lymph glands, adrenals, muscle, heart, and skin of the two cattle slaughtered two weeks after treatment showed no significant pathology. Similar examinations were made of the tissues of four cattle slaughtered 12 weeks later, omitting the brain and spinal cord, and no significant pathology was found (there was the dissimilarity in kidneys of one animal as noted above).

Conclusions

Frequent spraying with DDT at recommended concentrations over a prolonged period of time produces no damage to the treated animals detectable clinically, at autopsy, or by histological examination.

There was rapid storage of DDT to a level of 76 to 103 parts per million in the fat of individual animals, averaging 86 parts per million for all animals, but storage did not appear to occur beyond these levels.

DDT is stored almost entirely within the fat deposits of the body. Only a small amount is found in other tissues and then in proportion to the fat content of the tissue.

Summary

Hereford cattle, ten to 15 months of age at the initiation of the described experiment, were treated 31 and 36 times with 0.5% DDT emulsion at two-week intervals.

No ill effects of the treatment were observed clinically, at autopsy, or by histological study.

Chemical analyses showed an average storage of less than 90 parts per million of DDT in the fat of the cattle at the end of the experiment.

There was an observed average plateau of slightly less than 90 parts per million beyond which storage did not occur.

DDT storage was almost completely confined to the fat deposits of the body.

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Florida Anthrax Outbreak

Dr. L. L. Parks, Florida Board of Health, has supplied information relative to the recent anthrax outbreak in Florida. One human case of anthrax occurred in a cowboy who had skinned a cow that had died and had subsequently been found to be infected. Approximately 150 cows have died in Broward County, Fla., during the period from mid-October to December 1. Two veterinarians have since developed skin anthrax. These practitioners had been vaccinating cows in this area. One technician, working in the laboratory handling anthrax specimens, has also developed skin anthrax.

An extensive vaccination campaign has apparently brought the disease in cattle under control. It is expected, however, that additional cases will occur in this area and perhaps in adjacent areas which have been free from the disease for many years.—*Pub. Hlth. Repts., Nov. 1951.*

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Antirabies Legislation in Illinois

An antirabies bill, which was submitted to the Illinois legislature last year, provided for compulsory vaccination of all dogs and control of the stray or unwanted dog. That bill was defeated in the House.

Speaking in reference to the proposed legislation, *The Chicago Tribune* comments editorially that quite possibly eight persons who have been required to take the Pasteur treatment recently need not have done so had this bill been passed. Persons bitten were constituents of representatives who voted against the bill.

Comments the *Tribune's* editorial: "All three (legislators) apparently were more responsive to the threats of antivivisectionists who lobbied against the bill than to the health and safety of their constituents." Had the representatives instead of the constituents been bitten, the worthy bill might not have met such infamy.

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Dr. Alexander Zeissig, former veterinary consultant to the New York State Health Department, has joined the staff of Merck & Co., Inc., manufacturing chemists, as director of the veterinary research department.

Surital Sodium And Morphine Anesthesia In Canine Surgery

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THE use of surital®[1] sodium (sodium 5-allyl-5-(1-methylbutyl)-2-thiobarbiturate), a recently developed ultra-short acting thiobarbiturate, has been reported by several workers. It could be called the thioanalogue of seconal®[2] just as pentothal®[3] sodium could be considered the thioanalogue of nembutal®[4] [2].

Surital was first reported in veterinary literature by Reutner and Gruhzit[3]. They found it to provide excellent surgical anesthesia of short duration in dogs when administered at the rate of 17.5 mg. per kg. of body weight. If unforeseen surgical difficulties were encountered and the operation was prolonged, an additional one-fourth of the original dose was administered. This procedure proved satisfactory for operations lasting up to 45 minutes.

Wyngaarden, *et al.*,[5] and Spencer and Coakley[4] found that surital sodium produces an equally smooth and perhaps more rapid induction of anesthesia than pentothal, with fewer signs of excitement and more rapid recovery. They estimate that the potency is approximately 1.5 times that of pentothal in the dog. Similar results were obtained by Kelly, *et al.*[5]. Surital sodium accumulates more slowly in dogs than pentothal so that there appears to be less saturation of the detoxification mechanisms when this agent is employed[3]. Dillon and Denson,[6] after observing the actions of surital in 700 patients, found that in general the reacting and awakening time following its use is slightly shorter than that following the administration of pentothal. Woods, *et al.*,[7] demonstrated that surital is perhaps less, but definitely not more, toxic than pentothal, while Swanson[8] found it to be a dependable ultra-short-acting substance which did not produce intolerance upon repeated injection.

In most instances, surital should be given intravenously. However, Helrich, *et al.*,[9] and Dillon and Denson[6] used the rectal route of administration in very small children. Its use in this manner has not been reported in veterinary medicine.

In five experimental animal cases, Brinker, *et al.*,[10] injected 2 cc. of a 4% solution of surital into the tissues surrounding the cephalic vein. One cat showed a mild swelling which disappeared in two days, two dogs exhibited a mild local reaction, and two dogs showed a marked local swelling.

In dogs under one year of age, Roberts, *et al.*,[11] found that an average of 1.18 cc. of a 4% solution for each 5 lb. of body weight was required, while dogs over ten years of age required only 0.85 cc. of the same solution per 5 lb. of body weight. Dillon and Denson[6] observed that when morphine was given as premedication in human patients, only about three-fourths of the usual amount was required.

This paper deals with the use of morphine as a basal premedicant to surital anesthesia in dogs.

Method

A 5% solution of surital sodium (1 gm. diluted with 20 cc. sterile distilled water or saline) was administered intravenously 20 to 30 minutes after giving 1/4 gr. morphine and 1/150 gr. atropine sulfate in 150 dogs of various weights and ages. With this method, it was possible to administer this barbiturate intravenously unassisted. When preceded by morphine, it is ordinarily only necessary to administer approximately 0.5 cc. of a 20% solution for each 5 lb. of body weight. It is usually unnecessary to repeat injections.

Uses

Surital sodium with morphine may be used in all types of surgery in dogs. It is best in operations of 15 minutes' duration or less, but if longer time is required, more of the drug is easily administered. One-fourth of the original

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®[1]Parke, Davis & Company, Detroit, Mich.

®[2]Eli Lilly & Company, Indianapolis, Ind.

®[3] ®[4] Abbott Laboratories, North Chicago, Ill.

dose or less is usually sufficient for repeated administration to increase the period of anesthesia when the animal has received morphine premedication.

Although the writers have not used it on cats, Brinker, *et al.*,[10] reported good results on five cats when administered intravenously.

Observations

Little, if any, objection was evidenced during the period surital was administered. Excitement was shown in 1% of the dogs. Increased salivation caused by the barbiturate was easily overcome by the use of atropine. No vomiting occurred and no sloughing nor local reactions at the site of the injection were observed. Only two dogs in 150 required artificial respiration, and the respiratory depression in both was thought to be caused by too rapid administration.

An average of 25 minutes of surgical anesthesia was obtained when a basal of morphine was injected. Induction of anesthesia was smooth and promptly obtained with little sign of excitement. Recovery was rapid, and complete muscular relaxation was obtained.

Surital should be used within one week after dilution since absorption of CO_2 from the air brings about a lowering of pH of the solution which causes a precipitation of the salt[12].

Conclusions

Surgical anesthesia can be produced in dogs by the use of surital sodium intravenously. Anesthesia lasts from 15 to 40 minutes. Longer anesthesia is produced by the use of morphine prior to the injection of this ultra-short-acting barbiturate. Side effects were rare and complete recovery followed in three to five hours after injection, with partial recovery ensuing in about 25 minutes. When premedication of morphine is used, if additional anesthesia is required, usually 1/4 of the original dose is sufficient when administered as needed.

Following the use of morphine as a basal, it is possible to accomplish intravenous administration unassisted.

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New Veterinary Science Building at Wisconsin

The Board of Regents of the University of Wisconsin have approved the request of the Veterinary Science Department to rename the formerly designated Dairy Industry Annex as the Veterinary Science Building on the campus of the University of Wisconsin at Madison.

Extensive remodeling has already begun on this three-story building which will provide quarters for the department's pathology, bacteriology, and virology laboratories, as well as its library and offices. The space and facilities thus will be increased about fourfold over the present ones available to the department in the Genetics Building. Completion of the building for occupancy by mid-1952 is anticipated.

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The ideal age of pigs for vaccination against hog cholera is ten days to two weeks after weaning, according to advice of research workers of the Fort Dodge Laboratories. It has been found that resistance to hog cholera transferred to baby pigs from the colostrum of an immune sow often disappears by the fifth or sixth week. For this reason, many veterinarians may wish to vaccinate pigs five or six weeks of age while they are still nursing. Experimental work indicates satisfactory vaccination is possible at this age.

Experiences In Treating Feline Panleukopenia (Feline Distemper)

J. LAVERE DAVIDSON,* D.V.M., and GORDON G. STOCKING,** D.V.M.

Feline distemper, also known and referred to as feline infectious enteritis and infectious feline panleukopenia, is, in our opinion, a disease of a highly infectious nature and one that calls for rather specialized treatment. The disease was described in 1928 by Verge and Cristoforoni[1]; they and others[2,3] showed that a filtrable virus was the etiological factor.

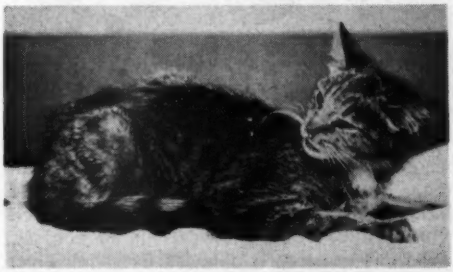
Feline distemper, like other virus diseases, is highly infectious and is characterized by sudden onset, rapid course, and rapid spread in catteries. Mortality rate is usually extremely high.

Symptoms

Several hundred cases of feline distemper have been referred to our clinic during the past several years. Approximately two thousand cats and kittens have been immunized against the disease.

The incubation period is believed to be from three to five days. Symptoms vary in that there appear to be two types of disease manifestation. One is fulminating, occurring suddenly, in which case symptoms may be overlooked or are not apparent; this type is referred to as "sudden death." The other type usually starts with a partial or complete loss of appetite and vomiting, especially when water is taken. Usually a thin, watery diarrhea is present which may, in the later stages, be tinged with blood. The animals will sit "hunched up", displaying little inclination to move about. After the first few days, there is usually a seropurulent nasal discharge and dacryocystitis is observed in practically all sick animals. The urine is scanty and highly colored, having a strong, pungent odor. At the onset of the disease the temperature may vary from 104 F. to 106 F., but as the course progresses the temperature is lowered and, in fatal cases, a subnormal temperature is noted for a day or two preceding death.

Dehydration is marked and is observed very early in the course of the disease. Mortality is high in the "sudden death" type; the course is so rapid that treatment is of little avail. In the other, slower type, mortality varies from five to 50% depending upon complications. When recovery occurs, the period of convalescence is short; as a rule, usually from five to ten days.



Typical attitude of a patient, exhibiting advanced symptoms of panleukopenia.

Prophylaxis

During the past five years 2,000 mature cats and partially grown kittens have been vaccinated, using Pitman-Moore's bio. no. 806 with excellent results. We feel that our results have been about 95% positive with this biologic. Only healthy animals were vaccinated. These were given two, 2 cc. subcutaneous injections at one week intervals. The routine use of prophylactic vaccination is sound.

Medical Treatment

All cats or kittens that exhibit symptoms of feline distemper are treated according to the following procedure:

1. Each mature cat is given a subcutaneous injection of streptomycin at a dosage range of 0.1 to 0.2 gm. once a day. Kittens are given graded doses according to size.

2. Ringer's solution is given to each cat or kitten at once and repeated daily. Doses range from 25 cc. to 150 cc. subcutaneously; not more than 20 cc. at any one site.

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3. Solulexin® is given intramuscularly each day in 1 to 2 cc. doses.

4. Lipo-adrenal cortex® is also given each day, occasionally every other day. Dosage, 0.25 to 0.5 cc. intramuscularly.

5. Somagen-solubilized®, ½ to 1 tablespoonful daily, mixed with milk.

Method employed for intramuscular injections in the cat.

Streptomycin is valuable in treating the secondary bacterial invaders associated with feline distemper, though it has no effect on the filtrable virus. Penicillin has been employed with only fair results; however, in some cases, a definite response is obtained by giving 1 cc. of depo-penicillin® each day. Apparently, bacterial invaders in feline distemper are more amenable to streptomycin than to penicillin.

Supportive therapy is of utmost importance in treating this cat disease. Ringer's solution, solulexin, lipo-adrenal cortex, and somagen-solubilized should be given according to the above schedule. Inasmuch as dehydration is always a problem, the use of Ringer's solution is vital. It contributes much to eventual recovery. It has been found that there is a lessened abnormal retention of water in the tissues when Ringer's solution is used, because the former contains small amounts of potassium and calcium in addition to sodium and chloride ions. For this reason, it is preferred when treating dehydration and electrolyte loss.

Solulexin is given to compensate for the loss of water-soluble B vitamins which occurs during the course of infectious processes. It also serves as a fast-acting tonic, stimulating appetite and releasing energy. Solulexin may be administered intramuscularly or, if desired, added to the Ringer's solution and given under the skin.

We use lipo-adrenal cortex as supportive treatment because it is known that an abundance of the adrenal hormones is essential for maintaining or re-establishing a normal electrolyte pattern and proper fluid balance between the various tissues of the body. Here again, our aim is to correct the ever-present dehydration. This is truly a life-saving drug.

Somagen-solubilized is most important as nutritive support because it assures an adequate intake of readily assimilated protein of high biologic value. Each 100 gm. of this substance yields about 70 gm. of protein, plus carbohydrates and the crystalline B vitamins. If an animal is in negative nitrogen balance, whatever therapy is used may be of little avail. By using somagen-solubilized daily, one can be reasonably sure that the patient can be kept in positive nitrogen balance with a much better chance of survival. Somagen-solubilized is given by adding it to milk or other food, if the cat is still eating. If not, the powder is dissolved in milk and force-fed two to three times a day. The somagen-solubilized and milk mixture is very palatable and cats will drink the mixture after refusing other foods.

The powder is placed in a cup or glass and milk slowly added until a paste is formed; then more milk is added, with continual stirring. A smooth mixture results.

Summary

In past years treatment of this dreaded disease was unsatisfactory. Numerous complications were observed. Now, by use of new drugs and supportive measures available, little apprehension is held for any except advanced cases.

Streptomycin is preferred in treating secondary bacterial invaders, at a dosage schedule of 0.1 to 0.2 gm. once a day, subcutaneously. This antibiotic appears to be superior to penicillin. Of equal importance is adequate supportive treatment which includes subcutaneous injections of Ringer's solution and solulexin. Lipo-adrenal cortex is given intramuscularly, and somagen-solubilized orally in milk or other food.

By following the above medical regimen, results in treating feline distemper have been quite satisfactory. Occasional losses suffered are those referred *in extremis*.

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Comparison Of Intramuscular And Rectal Vaccination Of Chickens Against Newcastle Disease

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IN previous studies on the immunological response of chickens to Newcastle disease virus (NDV) with the hamster-adapted, egg-propagated vaccine, the subcutaneous method of injection was found to be too pathogenic to be of practical value[1]. The following experiment was done in an attempt to find a satisfactory method of vaccine administration that would produce a high degree of immunity without marked pathogenicity for the chickens.

Materials and Methods

The chickens used in the experiment were healthy, eight-week-old New Hampshire Reds, obtained from a Newcastle disease-free source. Ten chickens were bled before injection to determine whether the sera contained hemagglutination-inhibiting or neutralizing antibodies against Newcastle disease virus. The sera were pooled for testing. Both tests were conducted according to the procedures outlined in the USDA bulletin,[2] except that in the hemagglutination-inhibition (H.I.) test the 1:5 dilution of virus was not used.

The vaccine contained hamster-adapted, egg-propagated, live virus described in a previous article[1]. It was made by inoculating nine-day embryonated, White Leghorn chicken eggs with a 10% suspension of the virus-bearing brains of hamsters from the 79th passage of the hamster-adapted NDV, California strain no. 11,914. Upon death of the embryos, the allantoamniotic fluid was harvested and pooled.

Seventy-eight chickens were vaccinated in the leg muscle with 0.2 cc. of 10% vaccine. Seventy-nine chickens were vaccinated rectally with undiluted vaccine, using a sterile brush such as the one used for laryngotracheitis vaccinations. Fifteen normal chickens were placed with each group of vaccinates as contact controls.

Twenty chickens were bled daily for the first five days, and thereafter on the seventh, tenth, and 22nd days after vaccination. Ten pools of blood were made, each pool containing blood from two chickens. Four pools were obtained from those vaccinated in the leg muscle, four from those vaccinated rectally, and one from each of the two groups of contact controls. The sera from this blood was used for H.I. tests. Twenty-eight days after vaccination, vaccinated chickens, contact controls, and 60 normal chickens that had been kept in a Newcastle disease-free house were challenged.

The challenge material consisted of allantoamniotic fluid pooled from eggs of the 27th embryo passage of NDV, California strain no. 11,914. It was titrated in embryonated eggs and eight-week-old chickens before use. All chickens were challenged in the wattle with 0.2 cc. of 10^{-1} dilution of virus.

Physiological saline was used for all dilutions. All calculations were made by the Reed-Muench[3] method. All chickens were observed daily for symptoms or deaths.

Results and Discussion

The H.I. titer of the pooled sera from the ten chickens bled before vaccination was 5.

TABLE 1. Results of H.I. Tests

Group	No. of days post-vaccination: 1	2	3	4	5	7	10	22
	H.I. Titer							
Leg muscle								
1	5	5	5	5	5	10	160	10
2	0	0	5	5	5	20	160	20
3	5	0	5	0	5	20	160	160
4	0	0	5	5	10	20	160	160
Rectal								
1	5	5	5	5	5	10	40	10
2	0	5	5	0	5	0	40	10
3	5	5	5	10	5	10	10	10
4	0	0	5	10	5	10	10	10
Leg muscle contact control	5	5	0	10	5	10	10	10
Rectal contact control	5	5	5	10	5	10	10	10

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The neutralization test showed that the sera had no neutralizing antibodies against NDV.

The challenge virus titrated $10^{-7.8}$ in embryonated eggs and $10^{-4.7}$ in chickens. The results of the H.I. tests are given in table 1. The results of the chicken vaccination and challenge are given in table 2. Eleven and one-half per cent of the chickens vaccinated intramuscularly and 3.8% of the chickens vaccinated rectally showed typical Newcastle disease symptoms or died after vaccination. No chickens of those vaccinated intramuscularly succumbed to the challenge, but 28.9% of those vaccinated rectally showed typical symptoms or died. The chickens that died had shown no symptoms when checked the previous day and death may have been due to other causes. The number of chickens that showed symptoms was kept separate from those that died. The high morbidity and mortality rate of the chickens vaccinated intramuscularly indicates that this vaccine is too pathogenic by this route of vaccination. The chickens vaccinated rectally did not build up sufficient immunity to withstand the challenge.

Summary

In a study using Newcastle disease, hamster-adapted, egg-propagated vaccine, 11.5% of the chickens vaccinated intramuscularly succumbed following vaccination but the remainder had 100% protection against the challenge dose of virus; 3.8% of the chickens vaccinated rectally succumbed following vaccination and 28.9% of the remainder succumbed to the challenge.

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TABLE 2. Results of Vaccination and Challenge of Chickens with Newcastle Disease Virus

Group	No. birds	Route of vaccination	No. showing typical symptoms	No. of deaths	No. challenged	No. showing typical symptoms	No. of deaths
1 Vac.	78	Leg muscle	5	4	69	0	0
1 C.C.	15	—	0	0	15	6	3
2 Vac.	79	Rectal	2	1	76	13	9
2 C.C.	15	—	0	1	14	6	7
3 N.C.	60	—	—	—	60	18	14

Vac.—vaccinated
C.C.—contact control
N.C.—normal

Effective Mastitis Control

(*Continued from page* 93)

may suffer noninfectious mastitis, but if constantly exposed to organisms responsible for the disease, will eventually become an infectious mastitis patient. On the other hand, a cow that is a carrier may develop a clinical case of the infectious disease without history of udder injury. In either instance, the predisposing factors may be controlled by proper herd management.

Research study has so far advanced understanding of the disease processes of mastitis that sound principles which are simple and practical may be applied. These resolve themselves into matters of considerate husbandry practices and thoughtful application of therapeutic agents. There is amply demonstrated the practical possibility of mastitis control if the dairyman wishes it.

According to report made by H. B. Benjamin, M.D., Milwaukee, Wis., at the Section on Small Animals at the Milwaukee meeting, a plasma extender or substitute may prove useful for the treatment of shock. This is an extract from okra, and preliminary experimental work on the product in dogs, gives promise of an inexpensive and readily available agent for emergencies. The preparation is not yet available commercially.

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Spooner's Station, Wis., flock production records, covering a period from 1946 to 1950, reveal that net returns from sheep were the most profitable of all livestock enterprises. In 1950, the net profit per ewe in the Spooner flock was $29.24. Ewes, the fall previously, were purchased for $17. to $20. each. The net profit figure represents nearly 150% returns on investment.

Summary Of Observations At The First Pan American Veterinary Congress, Lima, Peru

JAMES H. STEELE,* D.V.M., Atlanta, Georgia

THE First Pan American Congress of Veterinary Medicine was held in Lima, Peru, as a part of the 400th anniversary of the founding of the Greater National University of San Marcos. There were more than 200 delegates in attendance with about 10% of them from the United States. Dr. John G. Hardenbergh, executive secretary of the American Veterinary Medical Association, was the leader of the American delegation. There were representatives from most of the countries of the Western Hemisphere, the United Kingdom, Pan American Sanitary Bureau, FAO and UNESCO. Most of the meetings took place in the auditorium of the Faculty of Medicine. They began on Saturday, October 20, and continued through Saturday, October 28, 1951.

Veterinary Education

The theme of the conference was veterinary education. Dr. William Hagan, Cornell University, Ithaca, N. Y., was president of the Education Section. Many of the delegates expressed the opinion that this was one of the most interesting sessions. There were numerous items under discussion, such as the necessity for full-time faculty members, provisions for graduate training, research operations, the accreditation of schools, and the separation of veterinary medicine and animal husbandry. There are very few schools outside of the United States and Canada in this part of the world which have full-time salaried faculty members. Most faculty members serve part-time and obtain the greater part of their income from outside sources. The Rockefeller Foundation is assisting San Marcos University in developing a full-time veterinary faculty. This is being used as a demonstration, not only to the veterinary schools of Latin America but to medical and dental schools as well. The necessity of graduate training for faculty members was agreed on by all of those present. Many students go to North America for their graduate training; a few go to Europe. For these students to make the maximum contribution on their return, it was agreed by most of the discussants that they should have facilities to investigate problems which are of importance to animal health in their prospective countries.

The question of the separation of veterinary medicine and animal husbandry led to considerable discussion. The point was raised that it is difficult to include all veterinary subjects and that it is impossible to cover the field of animal husbandry and zootechnics in present day curricula.

Genetics

An enlightening discussion on genetic factors affecting animal production was led by Dr. J. L. Lush, Professor of Animal Breeding, Iowa State College, Ames. It was significant to note that some of the best research contributions in this field are being made by members of faculties of veterinary medicine. Dr. Maurice San Martin, professor of genetics, of the Veterinary College, University of San Marcos, is carrying on some excellent work in high altitudes. One problem of vital importance is sterility.

Brucellosis

A round table discussion dealt with the prevalence and distribution of brucellosis in South America and what control measures have accomplished. The summary of these is that little is known about the prevalence and distribution of this disease in cattle, goats or swine. Many countries are producing strain 19 vaccine. Dr. H. C. Bendixen, of the FAO, discussed the application of the ring test as a control measure. It was agreed by all of the participants that brucellosis is one of the most important animal diseases and public health problems of the Western Hemisphere. Some estimated that there may be as many as 100,000 human cases annually in North and South America.

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Tuberculosis

Dr. H. K. Sievers, dean of the School of Veterinary Sciences, University of Chile, Santiago, presided at the round table on tuberculosis. It was pointed out to this group that tuberculosis is a major health problem in nearly all of the countries of South America.

Dr. J. Alencastre, professor of infectious diseases, Veterinary School of San Marcos, stated that 75% of the adult cattle carcasses processed in abattoirs in the vicinity of Lima show evidence of bovine tuberculosis. In recent years, some attempts at control have been made in the dairy herds supplying milk in Lima. It is estimated that the prevalence of reactors has dropped from 50% to 30%, which is still a high figure.

Food Inspection

Dr. P. Mucciolo, professor of food inspection of the Veterinary School, Sao Paulo, Brazil stated that tuberculosis is found in a large number of cattle slaughtered in his country. Also, that tuberculosis is common in Paraguay, Bolivia, Chile and Argentina. In Argentina it is estimated that probably 12% of the herds are infected.

The public health significance of bovine tuberculosis was discussed. Few confirmed human cases of tuberculosis of bovine origin have been recorded in the United States during the past decade. The U. S. Public Health Service has not reported a positive culture since 1948. (Since my return two cultures have been confirmed as bovine tuberculosis from Connecticut.)

There was some discussion of the use of BCG in the control of bovine tuberculosis. It was the consensus that BCG has little to offer in the control of this plague in animals. It was agreed by all that the control in the Western Hemisphere should be one of the prime objectives of veterinary medicine.

Vampire Bat Rabies

Dr. Mark Rakover, professor of veterinary medicine, San Marcos Veterinary School, Lima, directed the round table discussion on rabies. This is a problem that exists in every country in the Western Hemisphere except Panama, some of the Central American countries and parts of the West Indies. Dr. V. Carnero of Sao Paulo, Brazil reported on vampire bat rabies and its distribution in South and North America. This virus cannot be distinguished from that of canine or other mammalian types of the disease. It was first discovered in southern Brazil about 1912. Since that time it has been reported in northern Argentina, Venezuela, Trinidad, Colombia, Equador, Panama, Honduras and Mexico. In 1951, seven human deaths and numerous cattle cases were reported in the Province of Sinaloa, 150 miles from the United States-Mexico border. It was pointed out that in some parts of Brazil and Venezuela more money is expended on the prevention of vampire bat rabies in cattle than for any other disease. The vampire bat remains infected for periods up to 150 days before death occurs. During this time it can transmit the virus in its saliva to any animal it attacks, including other bats. It was agreed by the participants that canine rabies can be controlled by compulsory vaccination and stray dog control. The problem of vampire bat rabies offers a tremendous challenge. Recent experience with avianized rabies vaccine in Mexico indicates that this may offer some hope in the prevention of the disease in cattle.

Foot-and-Mouth Disease

A round table discussion on foot-and-mouth disease was led by Dr. E. Eichorn, director of the Pan American Center of Foot-and-Mouth Disease in Rio de Janeiro, Brazil. The Pan American Center is carrying on foot-and-mouth disease research under the Order of the American States, which includes all of the countries of the Western Hemisphere except Canada. They are also serving as a typing center for the Western Hemisphere. Dr. F. Camargo of Mexico and Dr. S. Torres of Brazil, who were members of the panel, could not attend the Congress. It was the opinion of the round table that foot-and-mouth disease is one of the important animal disease problems of Latin American countries.

Parasitic Diseases

The round table on parasitic diseases was introduced by Dr. Douglas Watson of the Cerro de Pasco Corporation. He presented a well prepared paper on sheep parasites of Peru. Dr. Louis Gonzales, head of the parasitic research laboratory of the Veterinary School, Lima, presented material on the parasites identified in domestic animals and their geographic distribution in Peru. Such rare diseases as dracunculosis of a dog, cysticercosis in swine, and hydatid disease in sheep were discussed by Doctor Gonzales. He is one of the outstanding researchers in veterinary medicine in South America.

Poultry Diseases

A panel on poultry diseases was led by Dr. P. L. Levine of Cornell University, Ithaca, N. Y. This subject should receive considerable attention in future congresses. Poultry produce an increasing amount of essential animal proteins necessary in the human diet. For economical production, it is essential to minimize poultry disease.

A food inspection and animal quarantine discussion was led by Dr. P. Mucciolo of Brazil. Dr. L. R. Hurt, former chief veterinarian of Los Angeles County, participated. Doctor Mucciolo pointed out difficulty of adequate food inspection in countries where there is insufficient food for human needs. Often in areas where there is a chronic shortage of food, any food that is condemned eventually is utilized. Another problem discussed was the various professions that are concerned with food inspection. In many countries physicians, engineers, chemists, and even lawyers are inspectors. One delegate raised the question of why all imported animals must be free of tuberculosis and brucellosis when it is known they become infected within a year after entering the country. Sometimes sanitary measures are used in a retaliatory way. It was the hope of the panel that uniform quarantine procedures could be worked out for all countries.

There were over 200 papers submitted for the Congress but inasmuch as the time was limited, only a small percentage of these were read. Dr. Jose Santivanez, president of the Congress, plans to publish these in 1952.

Pan American Veterinary Medical Association Formed

During the Congress, it was suggested that a Pan American Veterinary Medical Association be formed. This was acted on at the final session. It was agreed that this Association would meet every four years, as the Pan American Congress of Veterinary Medicine. The next meeting of the Congress will be in Sao Paulo, Brazil in the winter of 1954. It will be a part of the centennial celebration of the Sao Paulo University. Dr. J. S. Viega, dean of the School of Veterinary Medicine, Sao Paulo University, was elected president of the next Congress and also will serve as president of the Pan American Veterinary Medical Association. Dr. Benjamin D. Blood, Pan American Sanitary Bureau, Washington, was elected secretary-general. It was agreed that the Executive Board would consist of the deans of the veterinary schools of the Western Hemisphere who were in attendance.

It is the feeling of those who were present at the Congress that an important step in the advancement of veterinary medicine was made at this meeting. It is believed that the recommendations made for veterinary education, animal disease control, research, and veterinary public health will strengthen veterinary medicine in North and South America. The second Pan American Veterinary Congress should receive the support of all veterinarians in North, Central and South America.

Disease Problems in High Altitude

Following the meetings, a number of the delegates visited Cerro de Pasco sheep ranch at Pachocayo in the high Andes. Dr. Douglas Watson is the chief veterinarian at this ranch and there are five assistant veterinarians. There are 185,000 sheep, scattered over a wide area at an altitude of between 10,000 and 15,000 feet. Disease problems are similar to those encountered in the temperate zones, but in addition such exotic diseases were described as polycythemia or mountain sickness and poliadenomatosis. Polycythemia is a disease reported in young sheep on ranches located at altitudes above 12,000 feet. Dr. Alberto Cuba, professor of pathology, faculty of veterinary medicine, Lima, has described this disease as a hypertrophy of the heart and liver, with a red blood count of 13,000,000 to 17,000,000. He also has published some material on poliadenomatosis, which is characterized by a proliferation of the alveolar wall. Eventually the lung becomes consolidated, followed by central necrosis of lesions and death. Bacteriologically, lesions are sterile. No mitotic figures have been observed, which indicates it is not a malignancy. Doctor Watson's preventive program to reduce parasitic diseases and diseases of the newborn has cut lamb losses from 30 to 4% in five years and saved $300,000.

Other delegates visited some of the veterinary projects operated by the Institute of Inter-American Affairs, U. S. State Department.

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Hemorrhages are generalized in cattle dead of trichlorethylene-extracted, soy-bean oil meal poisoning. Lungs, however, are free of such lesions. This is explained on the theory that clotting agents present in these organs prevent formation of subserous hemorrhage.—*M. J. Twiehaus, D.V.M.*

Bovine Leptospirosis, A Potential Public Health Problem†

KARL R. REINHARD,* M.S., D.V.M., Ph.D., Hamilton, Montana

THUS far it has not been demonstrated in the United States that Leptospirae of bovine origin are agents of human disease. However, bovine leptospirosis in this country has been studied only in the last seven years and a detailed picture of the syndrome has not been constructed. But it becomes apparent that this infection needs to be studied in relation to its public health potentialities when the lessons learned from research are considered: For example, it has been shown that the Russian,[24] and Palestinian[5,6,7,16] types are highly pathogenic for man. *Leptospira pomona* found in both hogs[14] and cattle[22] is also a human pathogen. Bovine infections in England have been ascribed to *L. icterohemorrhagiae*[11] the agent of Weil's disease. It was once thought that *L. canicola* was infectious only for the dog, but now it is known that the same species can infect man[14]. These facts indicate that public health workers need to be aware of the existence of bovine leptospirosis and other animal leptospiroses and to regard them as potential sources of human disease.

The bovine Leptospirae which have been isolated in the United States by Baker and Little[1,2] and Reinhard, *et al.*,[19] are typical of the genus in morphological and cultural characteristics, but have not been given a suitable species designation. Gochenour, *et al.*,[10] have demonstrated a serological relationship between these strains and *L. pomona*. In a later work from the same laboratory[20] the name of *L. bovis* var. *New Jersey* was given to a strain which was originally isolated by Baker and Little. However, the species *L. bovis* is preempted by the Palestinian type[5,13] which was shown to be different immunologically from the New Jersey strain[6].

Bovine leptospirosis has been found to be extremely variable in its clinical manifestations. Peracute cases are characterized by sudden death, marked hemoglobinuria, and sometimes icterus. Severe forms are encountered in which fever, hemoglobinuria, icterus, anorexia, and emaciation occur, but the animals usually recover after prolonged convalescence. There are other cases in which only vague, nonspecific signs are observed. These may sometimes escape detection because of the mild course. It is evident, then, that the disease can vary from a rapidly fatal form to inapparent infection. From the study of both natural enzootics and experimental infections there are indications that the mild form is the most prevalent type[1,2,19,20].

A highly specific sign of the disease is found in lactating cows and consists of reduced production of milk and a change in its character to a yellowish, thickened and sometimes bloody secretion. This change usually occurs during the time of fever. The disease is a type of infectious anemia, for even in cases where signs of hemolysis such as icterus and hemoglobinuria do not occur, a decrease in erythrocytic factors has been found[20]. In the acute stage, focal hepatitis, focal interstitial nephritis and sometimes petechial and ecchymotic hemorrhages in organs, serous and mucous surfaces may be seen. Usually the only pathological change which persists in the chronic stage is focal interstitial nephritis. Further details of clinical and pathological features may be found in the following papers[1,9,15,16,17,18,19,20,21,22].

The path of the agent through the infected animal is important to the public health worker. The anatomical location of the agent has been determined in experimental infections[1,2,20]. Leptospira have been cultured from the blood as early as one day after inoculation. In some cases the agent may persist in the blood for the entire prefebrile period. Fever usually occurs seven to ten days after inoculation and there is uniformly leptospiremia at this time and possibly one or two days thereafter. Leptospirae often can be cultured from the blood of the animals which die in the acute stage. There is some evidence that the liver is infected during the acute or febrile stage. The kidneys are infected both in the acute and chronic stages of the disease. Organisms have been demonstrated in two products eliminated

†Presented at the 4th Conference of Public Health Veterinarians, 78th American Public Health Association Convention, St. Louis, Mo., Oct. 30, 1950.

*Rocky Mountain Laboratory, U. S. Public Health Service.

from the body. These are the milk and the urine. The milk contains spirochetes during the period of decreased production when the milk is abnormal in character. This period also coincides closely with the febrile stage. Leptospirae have been found in the urine as early as febrile stage and as late as eight weeks after the fever. This indicates that the disease can lead to the chronic carrier state which is a factor of great significance.

The natural route of infection of cattle is undetermined. It has been suggested by Baker and Little[9] that the upper respiratory tract is one natural route of infection, since they were able to produce experimental infections by intranasal inoculation. The chronic urinary carriers among those cattle which have undergone infection are evidently the reservoirs of the disease. There is no evidence at present to indicate that animals other than cattle serve as reservoirs of infection. The disease can occur both as a barn and a pasture enzootic. Simple isolation procedures can limit the spread of the disease within a herd if the outbreak is detected at an early stage before the disease is disseminated.

Methods have been suggested for the control of the spread[1,8]. They hinge upon detection of carriers and the elimination of the carrier state. However, control procedures are hampered by the lack of a serological test which is adaptable to rapid surveys of large numbers of cattle. The commonly used microscopic agglutination and lysis technics are tedious and not entirely objective. There are no practical means of selective cultivation from contaminated sources, which makes it necessary to use expensive and tedious animal inoculation methods to isolate organisms from contaminated sources such as urine which is obtained under field conditions. The drugs which are known to be effective against the carrier state[6,9] are also excessively expensive for use upon a herd treatment basis. Before effective large-scale control measures can be worked out, technical and therapeutic advances must be made.

Should bovine leptospirosis become a public health problem in the United States, those who would be exposed most to infection probably would be the persons who take care of infected animals, meat handlers in uninspected abattoirs, home and custom butchers, consumers of raw dairy products, and individuals accidentally exposed to urine from carrier animals. Such persons deserve the attention of medical and public health workers. Coordinated work by the veterinary and public health professions will be required to establish the actual relationship of bovine leptospirosis to public health. If the bovine agent is found to be a cause of human disease, cooperative effort again will be needed to establish effective control procedures.

Addendum

Since the original presentation of this paper at the Conference of Public Health Veterinarians, American Public Health Association (A.P.H.A.), October 1950, several papers have appeared in the literature to add public health significance to the study of bovine and porcine leptospirosis in the United States. Dr. Morris Schaeffer (Proceedings 43rd Annual Meeting, Society of Clinical Investigation) reported the occurrence of aseptic meningitis in a group of young adults who swam in a waterhole along a stream in Alabama. Several cases studied revealed rising and falling titer for *L. pomona*. This outbreak was linked to an epizootic among hogs along upper reaches of the stream. Several surviving hogs of one lot also reacted to *L. pomona*.

Besson, *et al.*, (*Jour. Am. Med. Assn.*, 145:229 [Jan. 27], 1951), reported high reaction titers against *L. pomona* in serum from a human patient affected with iridocyclitis.

Coffey and associates (*Jour. Am. Med. Assn.*, 147:949 [Nov. 3], 1951) reported serological indications of leptospirosis in a man suffering aseptic meningitis. Here, again, the species incriminated was *L. pomona*. Since organisms found thus far in cattle and hogs of this country are the same or closely related to *L. pomona*, there is indication of a link between human disease and animal leptospirosis. Completion of the picture awaits actual isolation of the infecting organism from human cases associated with animal outbreaks.

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(*Continued on page* 123)

Public Relations Of The Veterinary Profession

NOT infrequently one hears speakers at veterinary meetings deplore what they regard as destitution of publicity for the veterinary profession and emphasize the need for it. "Why doesn't someone do something about advising the public of the value of veterinary service to American agriculture and the livestock grower?" ask these speakers. The answer to the question is that someone is doing something about it. For 18 years now, the American Foundation for Animal Health, an information bureau of the Associated Serum Producers, has been active in the preparation and dissemination of public relations material designed to enhance the prestige of the profession and to raise the public's appraisal of veterinary service and the veterinary practitioner. The Associated Serum Producers is made up of a group of producers who are engaged in the manufacture and sale of biological products, pharmaceuticals, and other supplies for veterinarians.

It is well known in advertising circles that the public reacts to advertising or any other type of publicity in direct ratio to its sincerity and the volume which appears in the public press. Large corporations employ expensive professional staffs for the exclusive purpose of improving their relations with the public by preparing messages which are repeated again, and again, and again. Such practices have been proved to pay because they impress by the simple expedient of repetition. An indelible impression is made in the minds of those who read or even thumb through newspapers and magazines, listen to the radio, or view television. Less concerted efforts fail. Infrequent use is made of uncoordinated "puffs" by those best informed in regard to the reaction of the public to publicity material.

Public Relations is Everybody's Job

There certainly is no denying that the greatest and best publicity has always been and will always be the type of professional service that well trained and sincere practitioners give livestock growers. None can gainsay that one reacts to a group or organization in accordance with his experience with a representative of that group or organization. Clients judge the veterinary profession by individual actions and thoughtful application of acquired skills to their disease problems. This "best foot forward" service is *nonpareil* in its capacity for producing good.

Notable progress has been made in raising the standards of the veterinary profession in the minds of the general public. Primarily this has come about because of the improvements in the services rendered by members of the profession. Many other efforts have contributed, not the least of which are the activities of the public relations division of the American Veterinary Medical Association. Activities of many minority groups have also contributed. These include organizations doing research work, the veterinary service of the American Public Health Service, Bureau of Animal Industry, and, last but certainly not the least, is the continuation of the planned program of the Associated Serum Producers.

ASP Public Relations Program

In 1934, a group of manufacturers of serum and other products, whose welfare was directly related to that of the practicing veterinarian, organized what is now referred to as the Associated Serum Producers. The stated purpose was to provide public relations information for the profession that might be concerted and centralized for distribution of press releases, and the preparation of advertising copy for farm newspaper and magazine use. It was felt that cooperative effort would most benefit the profession.

So encouraging was response to initial efforts, that in 1936 this group voted to expand the program and founded at that time the bureau known as the American Foundation for Animal Health. This bureau began to supply news releases regularly to newspapers and radio stations in the major farming states. These releases embodied two chief features: (1) They called the animal owner's attention to current health hazards and disease problems, and (2) they stressed the importance of making use of the services of the graduate veterinarians located in their respective communities, for dealing with these problems.

Several times since the initial organization, the group of companies supporting the As-

Farmer's Question Corner

PREPARED BY
American Foundation For Animal Health

What About Swine Brucellosis?

Q: What are the symptoms of swine brucellosis?

A: Often first warning is premature loss of unborn litters, or a high percentage of stillborn or weak pigs. Sometimes breeding hogs become paralyzed.

Q: Is the germ the same as causes brucellosis in cattle?

A: It is closely related, but is not the same type.

Q: Is swine brucellosis transmissible to humans?

A: Yes, it can cause human undulant fever. It is easily contacted by exposure to infected swine, such as handling sows at farrowing or careless handling of stillborn pigs.

Q: How can a person tell if his hogs have brucellosis?

A: The best way is to have the veterinarian check the herd and take blood samples for laboratory test.

Q: If the herd is infected what can be done?

A: Several control plans are available for both purebred and commercial herds. Sows already infected may lose their pigs, but heavy herd losses can often be curtailed by early detection of infected sows and isolation of healthy sows. Then a negative or "clean" herd can be built by raising shoats away from infected breeding stock, coupled with blood testing.

Q: What precautions should be taken to avoid getting brucellosis in my home herd?

A: Always isolate newly purchased swine, or have them blood tested by the veterinarian. Be sure not to bring in an infected boar.

Q: Is there any known cure?

A: There is no known drug or group of drugs which will cure this swine disease.

NOTE—Due to space limitations, general questions cannot be handled by this column.

Typical question and answer column, which is furnished to over 1,800 newspapers throughout the United States.

sociated Serum Producers Association have voted to expand the program which is now nation-wide in scope. Such expansion has occurred that at the present time annual pledges of member companies have increased to ten times the amount set up in the first year. Costs have been budgeted out of the earnings of these companies and have been paid for on an annual basis. Without question of a doubt, thousands of veterinary practitioners have in their own day-to-day experience felt the good effects of this program, but probably only a few are acquainted with the scope of the many mediums being utilized to reach the livestock owner, as well as the general public, or the channels utilized for educational purposes and public relations.

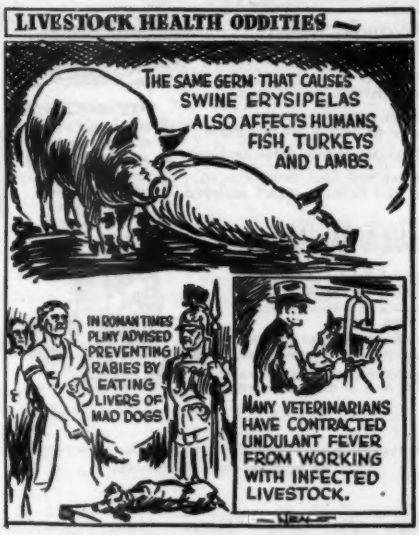
In general, the mediums now being employed include newspapers, radio stations, farm magazines, and moving pictures.

Public Relations Campaign in Newspapers

The newspaper campaign comprises releases in three separate categories. Regular news releases, which deal principally with timely animal health hazards and what to do about them, are released to newspapers across the entire nation.

Recently employed is that feature designated "Farmers' Question Corner." This publicity is a typical question and answer column now being furnished to over 1,800 newspapers from coast to coast. The third, "Livestock Health Oddities", takes the form of illustrations to point up the terrific toll of animal disease and the value of the service of local veterinarians. Illustrated here is one of the hundreds of these features which have been furnished newspapers across the country.

In addition to the three primary programs for newspaper publicity, special advertisements are occasionally prepared in accordance with timely need. At present count, newspaper releases of one kind or another are directed to more than 2,100 newspapers in the United States, having readers totaling 4,500,000.


LIVESTOCK HEALTH ODDITIES
THE SAME GERM THAT CAUSES SWINE ERYSIPELAS ALSO AFFECTS HUMANS, FISH, TURKEYS AND LAMBS.
IN ROMAN TIMES PLINY ADVISED PREVENTING RABIES BY EATING LIVERS OF MAD DOGS
MANY VETERINARIANS HAVE CONTRACTED UNDULANT FEVER FROM WORKING WITH INFECTED LIVESTOCK.

American Foundation of Animal Research

One of the hundreds of cartoon features which have been furnished to newspapers, coast-to-coast.

Radio Publicity

Year-round radio broadcasts are being furnished and utilized by 400 radio stations covering the entire nation. These radio messages stress the services of the local veterinary practitioner. Recent survey has shown that this material is being used virtually in its entirety by the stations covered.

Farm Magazine Publicity

Paid advertising in 14 leading farm magazines, with a nation-wide circulation of over 6,000,000, complements the newspaper and radio publicity. This campaign is carried on

KNOW YOUR LIVESTOCK PROBLEMS
Another in the series "What the Veterinary Profession Means to Mankind"
SHIPPING FEVER
HOW IT ACTS-
Watch for animals that are listless, go off feed.
Cough, nasal discharge, loss of weight are symptoms.
Fatal pneumonia often develops.
Can spread fast to home herd if new animals aren't isolated.
PREVENT LOSSES
BEST WAY TO PREVENT SHIPPING FEVER LOSSES IS TO FOLLOW GUIDANCE OF YOUR LOCAL VETERINARIAN.
WHAT TO DO-
Prevent fatigue, exposure of shipped-in cattle
Isolate new arrivals from home herd
Have veterinarian diagnose promptly if sickness appears.
Protective serum is advisable for sick or exposed animals.
Prepared by American Foundation for Animal Health

A typical advertisement from the series now running in leading farm magazines.

under the title, "Know Your Livestock Problems", which features large pictures and pointed copy dealing with animal disease hazards and stresses advantages of veterinary diagnosis.

Valiant Years Well Received

The film, Valiant Years, a dramatic movie showing the work of a typical veterinarian in an average community and dramatizing what his services mean to animal owners and the general health, is now distributed through 29 moving picture libraries throughout the nation. This film has had over 8,000 showings to more than 1,600,000 people and in 1952 will be booked before 3,000 more groups. It is difficult to assess the value of this effort but it is felt that it has made those people who have viewed the film more conscious of the role of the veterinarian in the life of the individual American.

Supervision of this spirited program is under the direction of a committee comprising research veterinarians, field men, and professional public relations experts. This committee meets at regular intervals to decide on subject matter and news and radio releases, farm magazine articles, advertising, and other material to be issued. All of the educational activities of the Foundation are guided by a committee of five veterinarians, three of whom have served continuously for more than 18 years. A central office is maintained in Des Moines, Iowa, where all material is correlated and where a major share of the public relations work is done. This is under the direct supervision of Mr. L. R. Fairall.

The fact that the Associated Serum Producers have granted $25,000. per annum research fund to the Veterinary Research Institute at Iowa State College, Ames, for the study of hog cholera virus and problems related to the immunology of hog cholera might also be considered as public relations activities.

Scene from the motion picture, Valiant Years, booked for 3,000 showings in 1952.

Working quietly and with no personal advertising other than their knowledge, skill and experience, practitioners have created a sound respect for the dignity of their calling and the economic benefits of their services over wide sections of our country; in most instances, these efforts have been met with commendable success for all. Veterinary service will continue to speak for the veterinarian substantially in proportion to the quality

of the service rendered. The practitioner can benefit himself and his profession by associating questions of clients and their problems to press or radio information that might be of recent publication or announcement in a given locality.

Group efforts ordinarily are expected to accomplish best results and for this reason the following suggestions are made to guide individuals in public relations matters.

1. Never release any information to the public press which is in any way deterimental to other veterinarians. Always attempt to tie in your release with information supplied by national source.

2. If you are asked to appear on a radio or television broadcast, hold up acceptance until you have the approval of your county veterinary society or state veterinary medical association. Whenever possible, radio and television participation should be sponsored by the local veterinary association rather than by you as an individual.

3. If you see any material that is derogatory to veterinarians, report it to the secretary of your state association. If such material appears in nationally circulated publications, it is well to report it to the secretary of the American Veterinary Medical Association.

4. Maintain friendly working relationships with your county agent, your local newspaper, and your county livestock organizations. Experience of others has indicated that favorable relations with these groups are valuable.

5. All practitioners are encouraged to participate as much as possible in the activities of local, sectional, state, and national veterinary medical associations in order to keep abreast not only with the professional material presented at regular meetings or at other times, but for the benefit of united and concerted action that will benefit the profession as a whole and its members as a group.

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Vibrionic Abortion

(*Continued from page* 88)

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EDITORIAL COMMENTS

Anesthesia of the Teat

A clinical note appearing in the *British Veterinary Journal* for October 1951 and prepared by George Dykes, M.R.C.V.S., Glasgow, Scotland, supports the hypothesis that the injection of local anesthetics into the teat canal results in sufficient degree of anesthesia to enable suturing to be done.

The author reports that in the most refractory cases encountered, including long and deep lacerating wounds of the teat, that the degree of anesthesia obtained by the injection of local agents enabled leisurely suturing without manifestation of pain by the animal patient and may be accomplished without restraint. This observation includes those cases that were noted to be very painful prior to the injection of anesthesia. The most sensitive portion of the teat was also observed to be the tip.

In the earlier work, 10 cc. of 1% solution of cocaine hydrochloride were employed. Later, and despite the reported contraindications concerning the suitability of procaine hydrochloride, equally good results were obtained with this preparation. Diffusibility was excellent in the case of both solutions.

In lactating cows, it is, of course, necessary to allow milk to drain off through a teat tube during healing. After proper preparation of the teat, a syringe is attached to the inserted tube and 10 cc. of 1% solution of the cocaine hydrochloride or procaine is injected slowly. After an interval of five minutes, it is usually possible to demonstrate loss of sensitivity of the external surface. Anesthesia has been obtained with lesser amounts, though most consistently satisfactory results have been obtained with the 10 cc. dose.

The author has no theory on which to base reasons for the action of this type of anesthesia. Considering the inconstancy in the course of the nerve supply, it has always been a problem to effect satisfactory anesthesia by infiltration. Furthermore, the injection of anesthetic agents is painful and these fluids in tissue spaces immediately adjacent to the lacerated wounds that require repair, frequently result in later edema that retards the healing process.

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Physostigmin acts as an antagonist to curare and thus serves as a satisfactory antidote.—*Deets Pickett, D.V.M.*

The Toll of Tuberculosis

While tuberculosis in cattle has been reduced to a fraction of 1%, statistics indicate that this disease is the no. 1 killer of man in the United States among the age group from 15 to 35 and is one of the chief causes of death of children throughout the world.

Streptomycin is considered to be the most effective therapeutic agent in active infection. Approximately 10,000,000 gm. monthly, or 90% of the total production of this antibiotic in the United States, are used for the treatment of tuberculosis.

Mass vaccination with BCG vaccine is practiced in Europe. Since the vaccination program of the United Nations International Children's Emergency Fund began in 1948 and up to January 1951, more than 12,000,000 children and young adults were vaccinated on the continent of Europe. It is said that the vaccination increased the resistance in 80% of those so treated.—*Industrial Bulletin of Arthur D. Little, Inc., Cambridge, Mass., December 1951.*

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Army Medical Service Unit Cited for Food Inspection in Korea

A five-man veterinary detachment of the Army Medical Service has received the Army's second highest unit award for inspecting 69,000,000 lb. of rations in six months while operating in direct support of United Nations troops in Korea.

The Meritorious Unit Commendation, first citation of its kind for an Army veterinary unit in the Korean conflict, was made to the 106th Veterinary Food Inspection Detachment for "outstanding devotion and superior performance" in setting up and operating an inspection network over a 100-mile area centered on the most forward supply point in the Korean combat zone.

Designed to inspect about 10,000 lb. rations daily, the 106th during the period from March 24 to September 23, 1951, "efficiently processed 69,000,000 lb. of rations in order to assure the wholesomeness of the food so vitally necessary to the combat effectiveness of United Nations troops in Korea."

The unit, headed by Captain Allan Zahn, UP '48, of Union City, N. J., received the award from General James A. Van Fleet, commander of the Eighth Army.

American Animal Hospital Association Announces Plans for Annual Meeting

The Program Committee of the American Animal Hospital Association (A.A.H.A.) has completed its preliminary plans for the Association's forthcoming annual meeting to be held at The Huntington Hotel, Pasadena, Calif., April 30 to May 3, 1952.

Featured attraction of this year's meeting is the use of telecasting for demonstration of surgical procedures and clinical aids. An ambitious program is planned in which a number of national authorities will participate.

A preconvention golf tournament, an annual feature for members and guests, is scheduled for Wednesday morning, April 30. The afternoon of the same day will be devoted to a closed business meeting. A three day literary program will begin on Thursday morning, May 1, and extend through Saturday.

All veterinarians are cordially invited to attend this meeting. Pasadena and The Huntington Hotel offer a unique setting and excellent facilities for the convention. This hostelry is official headquarters of the famous New Year's Day Rose Bowl activities.

A.V.M.A. Asks Nominations for 1952 Humane Act Award

Veterinarians and students in veterinary medicine throughout North America are being asked to submit nominations for the A.V.M.A. Humane Act Award, given annually to a boy or girl, not over 18 years of age, who has been exceptionally kind to animals.

Entries, giving full details about the kind act and mailing address of the nominee, must be submitted by April 1, 1952. They may be sent either to the A.V.M.A. office at 600 S. Michigan Ave., Chicago 5, or to Dr. George W. Mather, chairman of the Committee on Humane Act Award, University Farm, St. Paul 1, Minn.

The top award consists of a $100. U. S. savings bond and a framed certificate. Certificates of merit and subscriptions to the *National Humane Review* will be awarded to runners-up. Winners will be announced on June 23 at the opening session of the 1952 A.V.M.A. convention in Atlantic City, N. J.

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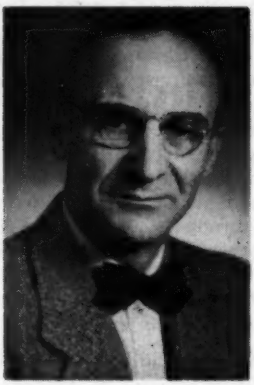
X-ray plates should be used only to complement diagnosis.—*Gerry B. Schnelle, D.V.M.*

The spacious Huntington Hotel, one of the finest in Southern California, will be headquarters for the 19th annual meeting of the A.A.H.A.

Dr. W. A. Aitken Named Editor-in-Chief of A.V.M.A. Publications

Dr. W. A. Aitken of Merrill, Iowa, has joined the staff of the American Veterinary Medical Association as editor-in-chief of publications. The Executive Board announced on January 31 that Doctor Aitken would take up his duties at the central office in Chicago about February 15.



Dr. W. A. Aitken.

Doctor Aitken was engaged in the general practice of veterinary medicine in Merrill, Iowa, for 21 years prior to accepting this appointment.

A chronicle of his career before entering private practice shows graduation with the degree of D.V.M. from Iowa State College in 1917; service in World War I, from 1917 to 1919, as a second lieutenant with the Army Veterinary Corps overseas; assistant state veterinarian, Iowa, in 1919, during the initial stages of bovine tuberculosis eradication; instructor in anatomy and later associate professor of surgery in the Division of Veterinary Medicine, Iowa State College, 1919 to 1931.

Doctor Aitken has been a member of the A.V.M.A. Council on Education since 1946 and chairman of the Council since 1950—a post he will relinquish when his successor is chosen at the A.V.M.A. convention in Atlantic City this June. Other highlights of his career include service as secretary of the Interstate Veterinary Medical Association from 1931 to 1937 and as president in 1940. In addition, he has contributed many articles to professional journals and has appeared on the programs of veterinary medical associations throughout the country.

Doctor Aitken was born in Paullina, Iowa, April 11, 1895. He married Elizabeth Ingersoll in 1921. They have two children: Robert, a petroleum geologist of Wichita, Kans., now on active duty with the Marine Corps, and a daughter, Kathleen.

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Vaccinates 1,000,000 Calves

A total of 1,000,000 calves have been vaccinated against brucellosis in California since 1948. This program of calfhood vaccination has been carried on by the California Department of Agriculture under the provisions of an act requiring that all dairy calves in the state be vaccinated at specified ages to prevent the spread of brucellosis.

Under the law, which became effective on January 2, 1948, the vaccination of all female dairy calves is compulsory but male dairy calves and beef calves may be vaccinated at the owner's option. The calf vaccination service is free to the owner. The state is authorized to contract with accredited practicing veterinarians to perform these services. At present there are 285 veterinarians in the state holding such contracts.

The age at which animals are vaccinated under this program has been set at six to 12 months. Each vaccinated calf is identified by the official tattoo in the left ear showing the year, quarter, and number, in a special design.

Among officials witnessing the vaccination by Dr. A. J. Whitaker of Manteca, of the 1,000,000th calf, were those representing various state departments interested. Dr. A. K. Carr, chief of the State Division of Animal Industry, referred to the cooperation of all that has made possible successful execution of the program. Its importance lies in the public health aspects of bovine brucellosis. Eradication of the disease from animal reservoirs will eliminate source of human infection.

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Cattle on Feed 11% Over Last Year

The Bureau of Agricultural Economics has estimated the number of cattle on feed in the United States on January 1 at 5,094,000 head; 496,000 over the number one year ago, and the largest on record.

Iowa and Nebraska rank first as leading cattle feeding states; both showing increases in numbers since last season.

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For some unexplained reason, antibiotics increase rumen bacterial count.—*Loyal C. Payne, D.V.M.*

A.V.M.A. Convention, Atlantic City, New Jersey, June 23-26, 1952

The Public Relations Department of the A.V.M.A. will shortly announce details for the literary program, entertainment, and other features tentatively scheduled for the 1952 annual meeting.

Of attractions that will receive top billing are those arrangements made again this year for closed-circuit telecasts of surgical, clinical, and laboratory procedures. Allied Laboratories, Inc., and Radio Corporation of America will provide improved facilities over those of last year in Milwaukee by enlarging TV-viewing equipment. Even a large crowd will be able to see telecasts comfortably in spacious accommodations.

Atlantic City's famed boardwalk as seen from City Park.

The famed attractions offered on Atlantic City's Boardwalk will provide extra and unique entertainment features. These and other always excellently planned social functions, including the president's reception and dance, are expected to add to the enjoyment of the families of visiting veterinarians. Assurance is given by those best acquainted with the facilities made available that they will provide enjoyable, relaxing days for those who can arrange to extend their stays for a few vacation days. Post-convention trips are also planned.

Provision is being made for 68 booths for commercial exhibits and approximately 18 for educational displays. These also promise visitors opportunity to acquaint themselves with the latest developments in many fields of veterinary medicine.

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A stronger A.V.M.A. is possible by the support of every American veterinarian. Most who pay their dues regularly, attend conventions, and otherwise assume an active interest, not only find it enlightening but they have a wonderful time doing it.

Proposed Control Measures for Atrophic Rhinitis

The Disease Control Committee of the Kansas Veterinary Medical Association, working with officials of the livestock commissioner's office, have proposed regulations which, if approved, will furnish measures of control for atrophic rhinitis, that have proved practical for other diseases.

According to the *Bulletin* (K.V.M.A.) for January 1952, these regulations provide for quarantine of animals and restriction of their movement except for slaughter. Provision is also made for premise quarantine.

Difficulties in recognition of atrophic rhinitis in animals of breeding age are acknowledged. Nevertheless, it is believed that these regulations will assist in preventing further spread of an already widespread disease of swine.

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Poultry journals have failed to clarify for their readers why the Army Veterinary Corps will not accept official government graded dressed poultry. Charges of Senator L. B. Johnson of Texas that duplication of grading services is resulting in a waste of money was ill advised. Actually USDA grading as it has been done is a matter of selection for flesh, fat, and finish, and has nothing to do with the wholesomeness of the food product. The Veterinary Corps is charged with the responsibility of seeing that men of the Armed Services are supplied with wholesome food, thus the inspection by veterinarians, in addition to assuring that the government gets the grade contracted.

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In its review of USDA research, the Research and Marketing Act Advisory Committee urged that the entire U. S. Department of Agriculture be designated a defense agency. It called attention to the importance of food to national strength. The group also recommended that the Department devote a higher percentage of its research effort to fundamental studies as a means of providing the basic information needed by industry and other agencies in seeking practical solutions to their problems.

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Abortion in cows, due to leptospirosis, may occur in the non-apparent, mild, or severe form of the disease.—*James A. Baker, D.V.M.*

PRINCIPLES OF ANIMAL HEALTH

R. R. DYKSTRA, D.V.M.
Manhattan, Kansas

Howell and Rollins of the University of California conducted some studies regarding Environmental Sources of Variation in the Gestation Length of the Horse. They summarize their findings, in general, as follows:

1. Season of breeding: "Mares bred during the period December through May on the average were 10.4 days longer than those resulting from breedings during the period June through November." This accounted for 44% of the total variance.

2. "Well fed mares averaged four days shorter than those mares on a maintenance ration."

3. "Seasonal variation in gestation length was found to be independent of the level of nutrition of the mare." The authors discuss the possibility of the length of daylight being a factor.

These same researchers also studied the Genetic Effects on Horse Gestation Length. A final total summarization is:

"Season of breeding accounted for 43.4% of total variance; level of nutrition of the mare, 5.2%; additive genotype of the foal, 18.3%; dominance deviations from the additive scheme, 7.1%; permanent maternal traits, 12.2%; and residual, unanalyzed causes, 13.8%."

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The kidney worm, *Stephanurus dentatus,* of swine, known to be the cause of economic losses to the swine industry in the southern states, has now invaded some of the droves in northern states. The parasite causes extensive destruction of tissue in the host, and its eggs, being voided with the urine, result in premise contamination. Direct sunlight, dryness and freezing are unfavorable influences for the larvae shortly after being hatched and before entering the body of the host. The symptoms of an infestation are not in any sense characteristic, though an autopsy reveals liver damage, atrophy of loin muscles, sometimes abscesses, and frequently the worm itself in the kidney or surrounding tissues. Only those that reach the kidneys, so that their eggs can be passed out with the urine, perpetuate their kind. There is no known curative treatment. The rigid application of sanitation, at this time, seems to be the only method of attempted prevention.

Since the fluoridation of water supplies has been adopted in a large number of cities, for the prevention of human dental caries, veterinarians are frequently asked to express their opinion regarding the effect of these treated waters on livestock consuming them. In man, the consumption of fluoridated water, in concentration of one part of fluoride in a million parts of water, does not produce clear-cut evidence of mottling of the dental enamel, nor any other evidence of impairment of the teeth. Since animals have much shorter lives in general than human beings, and as even mottling of the teeth, should it occur, is of no importance in animals, veterinarians may disregard this problem. However, fluorosis with bone deformity may occur in animals if they are given minerals having a fluorine content of more than 0.2%; or for cattle, sheep, and swine the upper limit of safety is represented by 0.01% of fluorine in the dry matter of the total ration. Raw rock phosphate is the mineral most likely to have an excess of fluorine. Bone meal has very small amounts of fluorine in the apatite form as calcium phosphate-fluoride.

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We recently asked a practitioner specializing in small animal practice, to give us his reasons for preferring the flank method of opening the abdominal cavity in cats over the ventral midline incision—the latter almost universal in dogs. His answer was that the abdominal ventral muscularis of the cat is very thin, and therefore it is difficult to cause strong union of wound edges in this region, the latter being highly essential to support the weight of the viscera, and the additional strain on this region by the crouching attitude of the cat at rest. In the flank laparotomy, all of the disadvantages of the meridian line incision are obviated.

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Veterinarians are frequently called upon to estimate the age of all species of domesticated animals. Seldom, however, are they asked to judge the age of a catfish as recently happened to one of us. A biologist informs us that the answer is found in the vertebrae, and is based on the theory that the growth of the vertebrae is shown by the addition of a layer of bone for each year of life.

VETERINARY PARASITOLOGY

A. O. FOSTER, B.A., M.A., Sc.D.
Beltsville, Maryland

Trypanosomiasis-resistant Cattle

Reviewing 20 years' experience in West Africa, Dr. J. L. Stewart, who retired a few years ago from the Colonial Veterinary Service, has emphasized the great potential value to Africa of the West African Shorthorn cattle[1]. The designation does not refer to a homogeneous breed, but rather to practically all the unhumped cattle of West Africa, which are primarily a mixture of Hamitic Longhorn, Dwarf Shorthorn, and Zebu. Despite certain uneconomic features (which, conceivably, could be largely corrected by intelligent breeding), these cattle are stated to be the one type that can exist in vast areas where, because of trypanosomiasis, no other cattle can survive. This interesting review emphasizes the author's belief that the production and development of trypanosomiasis-resistant cattle is more practical, and more generally desirable, than mass inoculation of animals with drugs or widespread chemical attack upon tsetse flies.

This is hardly the first time that an inherent resistance to disease has been ascribed to certain breeds of cattle and other animals. There is, moreover, a modest body of literature on the relationship between the genetic constitution of animals and their resistance to diseases and parasites. The resistance of Indian cattle was emphasized at a conference sponsored by the United Nations Organizations[2].

While there is evident need for further and more satisfactory information on the phenomenon in question, there are undoubtedly many interested individuals who, with the writer of this comment, are prepared, at least tentatively, to accept Stewart's hypothesis of disease-resistant stock. This position seems quite irreconcilable, however, with the expressed view of some that certain breeds or crosses involving Indian and African cattle, widely promoted in warm climates, are not more disease-resistant than other bovine animals, but are only relatively better able to withstand the weather and climate of tropical and subtropical regions.

[1]Stewart, J. L., The West African Shorthorn Cattle: Their Value to Africa as Trypanosomiasis-Resistant Animals. *Vet. Rec.*, 63:454, 1951.

[2]United Nations Scientific Conference on the Conservation and Utilization of Resources, May 1949. (To be published).

In experimental trials with enheptin (2-amino-5-nitrothiazole) on blackhead of turkeys, Horton-Smith[7] obtained excellent results, both therapeutically and prophylactically, with recommended concentrations of the drug in feed, namely 0.1 and 0.05%, respectively. Infections were induced by feeding embryonated ova of cecal worms (simulating the natural method of acquiring infections), and the medicated feed was given continuously during the trials. Mortality among the untreated control-poults was substantially 100%. No birds died in the treated groups, except some that were dosed at the prophylactic level (0.05%) beginning six or more days after exposure.

Although much attention has been given to the preventive use of enheptin, this has not proved as satisfactory as desired from economic and other standpoints. On the other hand, Horton-Smith's report, and some earlier ones, attest the reliable action of the chemical in the treatment of established infections. These considerations support the tentative judgment of some workers that the drug in question may be used best as a treatment rather than a preventive.

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Aureomycin, according to workers in Oklahoma,[8] exhibits a suppressive or preventive action in anaplasmosis. One susceptible cow, given a total of 25 gm. beginning 15 days after test inoculation, developed acute disease after a delayed incubation period of 69 days. Another, given a larger dose (46.25 gm.) beginning at the time of the first of five infected-blood inoculations within 40 days, failed to show either anaplasma bodies or reduced red cell count, yet subinoculation of 150 cc. of this animal's blood produced fatal disease in another cow after an incubation period of only 14 days. After subsequent splenectomy, the test animal showed a few anaplasma bodies but no symptoms. This is reputed to be the first instance in which a medicinal chemical prevented the development of anaplasmosis in a susceptible animal.

[7]Horton-Smith, C., and Long, P. L., *Vet. Rec.*, 63:507, 1951.

[8]Foote, Lon E., *et al.*, *N. Am. Vet.*, 32:547, 1951.

POULTRY PRACTICE PROBLEMS

W. R. HINSHAW, D.V.M., Ph.D.
Frederick, Maryland

Anthrax in Birds

During the past year, there have been several outbreaks of anthrax reported in farm animals in areas where the disease is not normally a problem. These outbreaks have created an interest in the number of species of animals which are susceptible and which might act as carriers from infected to noninfected premises. Questions regarding the susceptibility of wild birds and domestic fowl have been asked the writer. Because of this interest it was thought timely to discuss briefly anthrax as a disease of birds. A very good review on this subject has been given by Stafseth in Diseases of Poultry (edited by Biester and Schwarte, p. 358). One of the earliest and best reviews previous to that of Stafseth is given in the classical textbook on Poultry Diseases by Ward and Gallagher published first in 1920. The discussions which follow are taken largely from these two reviews.

The ostrich is apparently the only bird in which the disease occurs naturally. Epizootics have been reported in this species by several writers. The disease in the ostrich is of a septicemic nature and may be acute or chronic. In the more chronic type which is the usual form, the sick birds show symptoms of a general illness and refuse to eat for several days. Many recover. The pathology of the disease is similar to that seen in domestic animals. Lesions include slight coagulation and dark discoloration of the blood; increase in thoracic and abdominal fluids; petechial hemorrhages in the pericardium, peritoneum and mesentery; hemorrhagic enteritis and gelatinous infiltrations in the subcutaneous and deeper tissues. The pneumonic type of the disease is rare.

The natural disease is extremely rare in other birds. The few cases which have been reported have usually resulted from the birds' eating large quantities of infected animal tissues. One outbreak reported occurred in ducks about ten days following the death of a cow on the same farm. Two varieties of ducks and a small flock of chickens were exposed but anthrax developed in only one variety of ducks. Five of these "mute" ducks (*Cairina moschata*) became ill and died. A few cases have been reported in birds in zoological gardens following the feeding of meat containing large numbers of the anthrax bacilli.

Experimental infection of birds has verified the field observations that birds under normal environments are not susceptible to anthrax. Many theories are given for this resistance, and one of the most common is that the high normal temperatures of birds prevents growth of the organism. A common explanation for the susceptibility of the ostrich is that it has a normal temperature more nearly like that of mammals.

No information seems to be available on confirmed cases of transmission of anthrax from an infected farm to a noninfected farm by birds. Buzzards especially have been suspected but as far as the writer knows have not been proved as carriers. It would be of scientific as well as of economic interest if some well controlled research work could be done on birds as possible carriers of this disease. The buzzard should be an interesting subject to use for such a research project. It would also be of interest if veterinarians, who have anthrax outbreaks to handle, would investigate bird populations in outbreaks for possible cases in wild birds.

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The fertilizing capacity of diluted chicken semen was investigated by Weakley and Schaffner at the University of Maryland (*Poultry Sci.*, 30:932 [Nov.], 1951). Using the natural serum obtained by centrifuging semen to remove the spermatozoa, whole semen was diluted in ratios varying from 1:3 to 1:80. The fertility from insemination with diluted semen was compared with that obtained with undiluted semen. That which was diluted as much as 1:10 provided fertility that compared favorably with that obtained with the undiluted. A single insemination with 0.1 ml. of semen was made and observations were recorded for two weeks. Dilutions greater than 1:10 showed a marked decrease in fertilizing capacity and the decrease was, in general, proportional to the dilution.

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According to a report by Winton (*Poultry Sci.*, 30:933 [Nov.], 1951) given at the 1951 meeting of Poultry Science Association, one out of every ten adult chickens dies annually from avian lymphomatosis. He estimated that these losses translated into monetary terms, mean at least a $1,250,000. loss each week in the year.

ABSTRACTS OF LITERATURE

Malocclusion in the Chinchilla[1]

Attention of veterinarians in many parts of the United States has been directed to dental abnormalities in chinchillas, since the culture of these fur animals has interested fur farmers and others.

Malocclusion is responsible for a condition commonly referred to as "slobbers." Affected

Fig. 1. Normal occlusion (upper); extreme malocclusion (lower).

animals salivate excessively and are reluctant to swallow. Resulting drooling or only wet fur around the mouth are suggestive of dental abnormality which may be causing bruising or laceration of buccal mucosa.

Causes

Foreign bodies lodged in the mouth or teeth may produce discomfort, pain or laceration with resulting slobbers. Malocclusion, however, is most common. This may occur in heavy producing females, less often in others, as a mineral imbalance or deficiency. Teeth loosening in the alveoli may deviate and not oppose opposites. In such cases, damage to membranes lining the mouth may result from tooth overgrowth and dental points or spurs, not unlike those common in horses.

Restraint for Dental Surgery

Anesthesia may or may not be employed, depending on the tractability of the patient and its general condition. Availability of trained assistants may also decide whether or not anesthesia is administered. When used, nembutal® has given the author best results.

Dental surgery is not considered to be shock-producing in most animals and these are operated upon without general anesthesia. The chinchilla is wrapped in a towel and is placed on its back on the operator's knee and one of the specially designed speculums inserted. Two of these are available from the F. C. Fehrman Company, Washington, D. C.; the Fehrman-White chinchilla incisor speculum (fig. 2), and the molar speculum (fig. 3). The latter is equipped with retractors for the cheeks, which allow clear observation of the mouth. A head light or suitable overhead lamp is satisfactory for illumination. An otoscope also serves if one wishes to make a careful search for small foreign bodies.

Fig. 2. Fehrman-White chinchilla incisor speculum (front view) in position, illustrating how the incisors fit into slots, affording protection of the gums during grinding operations to correct alignment, elongation, uneven wear, or other abnormalities.

[1]White, L. R., Treatment of Slobbers in Chinchillas. *National Chinchilla Breeder*, 7:12 (Dec.), 1951.

®Abbott Laboratories, North Chicago, Ill.

Procedures

An electric grinder having a flexible shaft, to which may be secured an emory or sand disc, such as are used as portable grinders by dentists, serves well to grind elongated incisors. Care must be taken that proper alignment is obtained. Uneven wear is thus corrected and the teeth sharpened for normal function.

Tooth nippers and Swiss jeweler files are used to cut and smooth spurs or enamel points.

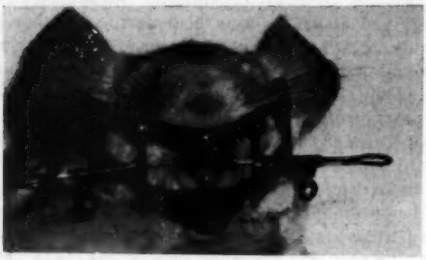

Fig. 3. Fehrman-White chinchilla molar speculum (front view) in position, illustrating the arrangement of cheek retractors.

The nippers are those used by manicurists for removing cuticle. The files, with cutting edges on one side only, are available as straight or curved files and suit the purpose intended of removing these abnormal features which either prevent proper mastication by mechanical obstruction or injure the mouth during masticatory processes.

After Care

Many affected animals are allowed to progress to the point of such low resistance that precautions must be taken to avoid pneumonia. Nutritious diets should always be supplied to assure prompt recoveries.

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Simple Method of Obtaining Urine from Cattle and Horses

If it is difficult to obtain urine from mares or cows, it is suggested[8] that air be blown through a catheter into the bladder. This causes an expansion of the bladder wall and stimulates urination as soon as the catheter is removed. There is no danger of bursting the bladder. In gelding and stallion, the same procedure is suggested, but the catheter should be pushed deep into the organ toward the ischium.—*R. S.*

[8]Neumann-Kleinpaul, K., Ueber die Harnentnahme bei Pferd und Rind. *Die Veterinaermed.*, 3:322, 1951 (from *Muench. Vet. Med.*, 5:294, 1950).

Infectious Anemia in Horses

Russian investigators[9] report that not only a virus, but also a newly discovered bacterium is the causative agent of infectious anemia of horses. On special culture media, it is possible to grow the filtrable and microscopically visible form. It can also be crystallized in this form it is highly resistant to chemical-physical and temperature influences.

The determination of nucleoproteids in the serum, by means of acid fuchsin, affords a dependable method of diagnosing the disease. Virus multiples in the organism at the expense of the nucleoproteids (and not of the erythrocytes). The bacterial form could be determined in all of 400 horses investigated, even though 200 were considered in good health. The virus form was found not only in horses, but also in cattle, sheep, swine, rabbits, chickens, and dogs.

An allergen was produced from the virus and from the bacterial form of the causative agent of infectious anemia. With it, 98% of sick horses gave positive allergen reactions. Finally, it is stated that the Russians developed a vaccine for therapeutic and prophylactic uses.—*R. S.*

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Epidural Anesthesia in Colic of Horses

Rectal examination of an eight-year old gelding, highly nervous due to severe colic, revealed a stone-hard, round fecal mass twice the size of a fist, which was so located in the intestine that it could not be removed manually. Injection of 10 cc. of a 2% procaine hydrochloride solution into the epidural space relieved the distress. After ten minutes, the abnormally contracted sphincter ani and intestine relaxed sufficiently to permit removal of the tightly held fecal mass without difficulty. This body weighed 420 gm. (about 15 oz.). Overfeeding of the animal with bran by its owner, a baker, was believed to have caused the impaction.

From this surprising experience Professor Steinmetzer[9] concluded that it is possible to treat spasms and colic successfully through epidural anesthesia.—*G. L.*

[9]Boszjan, G., Ueber die Infectioese Anaemie der Pferde. *Die Veterinaermed.*, 3:228, 1951 (from *Medyc. Wet.* 6:395, 1950).

[9]Steinmetzer, Karl, Epidural Anesthesia. *Wiener Tierärztl. Monatschrift*, 37:282 (April), 1950

Clinical Results Following Terramycin Therapy in Virus Diseases

MARTIN G. LORBER, D.V.M., Winston-Salem, North Carolina

This report covers the use of terramycin in the treatment of virus diseases. No attempt has been made to use it in any other condition where present medication has been satisfactory. Indications are that it is effective in infections of the intestine and urinary tract, but no effort will be made to report results of its use in these cases.

Small animal patients are referred suffering from two common virus diseases. These result from infection by the virus of Carré and an unknown virus which is referred to here as virus X. In the latter, animals are presented generally with a temperature ranging from 102 to 103.5 F. Predominant symptoms are anorexia, listlessness, conjunctivitis and occasionally a slight moist cough. Tonsils are rarely affected and in no case has a purulent nasal discharge been observed. The first case examined was on November 22, 1948. At that time, a diagnosis of virus distemper (Carré) was made and the patient treated as recommended. Results were disastrous. Many cases following this one developed a secondary pneumonia and subsequently died. Since the medical profession has referred to virus pneumonia as a disease entity, the writer concluded that the same or a similar infectious agent was attacking dogs. Animal patients exhibited symptoms common to those of human influenza. In this report, the term virus X is used broadly and not specifically. The disease is specifically differentiated from infectious canine hepatitis and hard pad disease.

Terramycin is credited with good results of treatment. Desicol kapseals®[1] (an ox bile concentrate), orthoxicol®[2] (synthetic codeine cough syrup), and a tablet containing camphor, atropine, and aconitine have supplemented the antibiotic in some cases. These were used for relief of respiratory symptoms and the desicol to help keep the intestinal tract clear. Other supplementary agents used included dextrose solutions for parenteral administration and vitamins, principally those of the B complex.

Terramycin has been employed alone and in combination with other drugs and chemotherapeutic agents to test its clinical effectiveness. Administration is simple. It is regularly prescribed, to be given by the owner. In some cases, effect is so rapid as to keep the body from building up sufficient resistance against the infective agent. In these cases, relapses may be common in about seven to ten days.

Owners are the best nurses of pet animals. All cases are treated as ambulatory patients. Examination is made every 48 hours to correct or add medication as indicated. With the exception of some distemper cases where hospitalization is necessary to control secondary infection, all are treated at home. Terramycin is prescribed on a minimum basis of 10 to 15 mg. per lb. of body weight divided into four doses administered at six-hour intervals. Since the difference between three daily doses and four may be the difference between success and failure, clients have objected little.

In most cases, four days of treatment have been sufficient to effect relief of symptoms. If four days of treatment fail to produce appreciable change, only supporting treatment may prove of value.

The following cases are typical of those referred for treatment.

Case 1. Mongrel terrier, weight about 15 lb., was presented exhibiting symptoms of anorexia, listlessness, conjunctivitis, cough, and slight tonsillitis. Rectal temperature was noted to be 105.2 F. Diagnosis; distemper. Desicol and CAA tablets were dispensed; one each, t.i.d. Terramycin was prescribed to be given every six hours. After 48 hours, temperature had dropped to 102.6 F., appetite had improved, as had general disposition. CAA tablets and terramycin were continued for another 48 hours, at which time the dog was discharged.

Case 2. English Setter, weight about 45 lb., exhibiting symptoms similar to those described in case 1, was noted to have a temperature of 103.4 F. Diagnosis; virus X. Desicol was dispensed and terramycin prescribed at the rate of 150 mg. every six hours. In 48 hours, the dog had recovered completely. There was cessation of all symptoms except a slight cough. The same drugs were again used and orthoxicol added. One week later the dog was returned, suffering with identical symptoms

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®[1]Parke, Davis & Company, Detroit, Mich.
®[2]The Upjohn Company, Kalamazoo, Mich.

noted earlier. Treatment outlined was repeated with favorable results. One week later, symptoms suggesting encephalitis were observed. These were principally incoordination and dilation of the pupils. Thiamin in heavy doses was injected intravenously for three days and given orally for 30 days. Diet was adjusted and vitamins added. Recovery was complete in a short time. This case is an example of one recovering too rapidly.

Case 3. Pekinese, weight about 8 lb., was, on careful examination, reported in with a temperature of 105.4 F., noted to be listless and cachectic. Diagnosis; early stage of distemper. Terramycin, 50 mg. every six hours, was the only treatment prescribed. Re-examination in 24 hours revealed only a slight drop in temperature; however, the general disposition had improved. The drug was prescribed for 72 hours more, at which time recovery was evident.

Case 4. Spitz, weight about 12 lb., was presented with typical virus X symptoms with some choreiform movements obvious. This dog had been sick for a period of two weeks. Terramycin was prescribed on a basis of 75 mg. every six hours. On the third day of medication, the animal came down with definite symptoms of chorea and euthanasia was performed.

Case 5. Dachshund, weight about 20 lb., was examined and a tentative diagnosis of virus X made. The condition had begun just two days prior to examination. Terramycin, 75 mg. every six hours, was prescribed. In 48 hours, the animal's appetite had improved, as had the general disposition. Another course of terramycin was prescribed and the animal was discharged at the end of 72 hours.

Of the 77 complete reports, 67 patients were completely cured, six died or were destroyed because of encephalitis and four died despite treatment. It was impossible to get complete reports on about 50 animals.

Summary

Terramycin in proper doses is highly effective against virus X and distemper. No side reactions such as vomiting, loose stools, etc., have been noted following the administration of this antibiotic. A basic minimum dosage of 10 to 15 mg. per lb. of body weight with a minimum of 50 mg. every six hours have given satisfactory results. Four days is the minimum time necessary to effect relief of symptoms, but should be continued for another 48 hours whenever possible. Supportive treatment, such as glucose, is necessary in many cases to relieve symptoms of dehydration and to supply energy. Patients that respond too rapidly may relapse in seven to ten days, possibly because insufficient time is allowed for body defenses to build up the necessary resistance.

The writer has found that ambulatory patients have a better chance of recovery than those hospitalized. Feeding small amounts of nutritious foods five or six times daily is recommended, particularly for lap dogs.

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Use of Chloramphenicol (Chloromycetin) for Treatment of Coccidiosis in Dogs

E. A. MAJILTON, D.V.M., Miami, Florida

For the past 2½ years, the writer has treated most of the cases of coccidiosis presented with chloromycetin®. This drug was chosen because most of the time Coccidia are identified in small, weak puppies. A majority of cases have been in Chihuahuas and other small breeds under eight weeks of age. Chloromycetin in doses of 25 to 50 mg. per lb. of body weight each 24 hours for four days does not upset them nor interfere with the appetite. At the same time, it combats secondary invaders during a period when the puppies are particularly susceptible. With all cases of Coccidia, besides putting patients on a high protein and vitamin diet, normal serum is given at the rate of 2 cc. per lb. of body weight. No attempt has been made to classify types of parasites.

A typical case history is as follows: A Boston Terrier, weighing 3 lb., with a tendency to vomit readily, came in with a 4-plus infestation of Coccidia. One 50 mg. chloromycetin capsule was given each six hours. The pup was checked each day and at the end of four days oocysts were entirely gone from the stool and although there was a purulent discharge from the nose for a week after, the dog did not miss a meal nor have any other side reactions. This high dosage is indicative of the excellent tolerance small dogs have for chloromycetin.

In 74 cases, where it was possible to follow up and recheck the stools, 56 cases were cleared up after four days. Twelve cases were given two series of chloromycetin. Five cases developed typical chewing fits and two developed chorea.

There were enough cases where chloromycetin was dispensed and the clients returned

®Parke, Davis & Company, Detroit, Mich.

after a long period of time with a well dog having a negative stool, to credit the drug with a higher percentage of efficacy than the above figures would indicate.

Chloromycetin is a useful drug in treating coccidiosis in dogs.

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Removal of Infected Deciduous Canines in a Monkey

EDWIN E. EPSTEIN, D.V.M., St. Louis, Missouri

On January 26, 1952, a telephone call was received from a client whose young, green monkey had been treated for pneumonia some months before. The owner advised that the monkey's jaws were swollen, that the patient appeared to be in pain, and that one of his teeth was loose. As the call was received during office hours on a busy Saturday, the writer promised to have the pharmacist deliver a prescription to ease the monkey's pain.

The following prescription was telephoned to the pharmacist:

Elix. Methadon Hydrochloride
Elix. Phenobarbital āā 15.
M. Sig. One teaspoonful in honey every hour.

Upon the writer's arrival at the house at 6:00 p.m., the six-pound monkey was in good spirits; medication given previously had not made him any less active. Examination of the mouth disclosed definite irritation of the gums surrounding the deciduous canines, and as the client had said, one of these was loose.

It was impossible to restrain the animal adequately for an intravenous injection, so that sodium pentobarbital was injected intraperitoneally at the rate of 1.25 cc. per 5 lb. body weight. The injection took effect in less than three minutes, and anesthesia was complete within five minutes. So rapid was the effect, it was feared that the monkey's tolerance for the drug had been misjudged.

While under anesthesia, a close examination of the mouth was possible. The affected canines were found to be of a dirty, brown-grey color. All of the four canine teeth were removed with ease and alveoli packed with sterile sulfanilamide and gelfoam.

Breathing was regular and pupils were slightly constricted. Two cc. of sodium caffeine benzoate and 1 cc. of adrenal cortex were given intramuscularly, with 300,000 units of penicillin. Instructions were given to keep the monkey warm, turn him frequently, and keep his head lower than his body with his tongue out in case of any bleeding.

The next day at noon the client called to advise that the monkey was still sleeping. A second call confirmed the fact that the animal was under profound anesthesia. A visit to the house was made and 1 cc. of metrazol® was given intravenously. Within a few minutes the monkey began to stir and move his limbs. Instructions were left to have some aromatic spirits of ammonia held under his nostrils for a few moments every half-hour.

Two hours later, the pet was noted to be partially conscious but very groggy. He was able to take a little water when given to him by means of a moistened finger. A few drops of aromatic spirits of ammonia were added to a teaspoonful of water and the monkey was encouraged to take the liquid.

Uneventful recovery followed and castration is scheduled. The amount of sodium pentobarbital given will be reduced to 0.75 cc. per 5 lb. for this surgery. It is expected that this dosage rate will provide adequate surgical restraint.

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Bovine Leptospirosis

(*Continued from page* 107)

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BOOK REVIEWS

Books reviewed in this department and any other books, if available, may be obtained by remitting the published price to the Book Department, Veterinary Medicine, Suite 803 Livestock Exchange Building, Kansas City 15, Missouri.

SHEEP MANAGEMENT AND DISEASES, by *H. G. Belschner, D.V.Sc.*, H.D.A. Deputy Chief, Division of Animal Industry, Department of Agriculture, New South Wales, and External Lecturer, Sheep Diseases, Faculty of Veterinary Science, University of Sydney. 705 pages, 340 illustrations. The Blakiston Co., Philadelphia 5, Pa., publishers, 1952.—Price $10.00.

This book is the culmination of 25 years of clinical experience, research investigation, and digest of the world's veterinary literature on sheep diseases. It is the most comprehensive work of its kind that this reviewer has had the pleasure of studying. The material is concisely presented with an abundance of illustrations and should fill a long felt need for a textbook for veterinary and agricultural students, as well as being an informative guide for the sheep raiser, and of considerable value to veterinarians.

More than half of the contents is devoted to diseases of sheep. The subject matter in this section includes anatomy and physiology, differential diagnosis, infectious, noninfectious, and parasitic diseases, and anomalies of the wool and skin.

New light is thrown on the cause of bighead and referred to as photosensitization or fagopyrismus. The opinion held by some engaged in sheep practice is that this common illness is dietary in origin. Research by Dr. L. B. Bull now indicates that it is a wound infection due to introduction of the same organisms which are responsible for black disease, *Clostridium novyi.*

The reader should bear in mind that when the author states a disease is "seasonal" it is based upon the Australian seasons. The summer months on that continent are from November to March.

In classifying the susceptible ages of those affected with blackleg, the author mentions lambs having died of blackleg after vaccination with enterotoxemia vaccine. This, however, is no reflection upon the practice of immunizing sheep and lambs against "overeating disease", as it is emphatically recommended.

The terminology may be a bit confusing to the reader as the glossary of sheep and wool terms does not include such expressions as "mob" (flock), "paddocks" (pastures), "grazier" (sheep raiser), "strike" (depositing of larval maggots in wounds), etc., which are of common usage in this book.

Sheep in Australia are bred primarily for wool production so culling of flocks is advocated just prior to shearing as the sheep are then carrying the full evidence of their value.

Gestation is given as being 149 to 151 days, which is a bit longer than the average shown by frequent checks in this country, and is no doubt based upon the records of the Merino, which is the predominating breed.

The reviewer has found it difficult to discuss this book without use of many superlatives. It is the best that has been written on the subject thus far.—*Harold J. Mostyn.*

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THE COW OWNER'S HANDBOOK, by *E. T. Baker, D.V.M.* 213 pages, 33 illustrations. Prentice-Hall, Inc., New York, N. Y., publisher, 1951. — Price $3.95.

This little book will serve the purpose intended; to brief owners of a few cows, or only a family cow or two, on what to look for and what to do in an emergency. The necessity for technical assistance for correction of abnormal conditions is emphasized. Husbandry matters such as feeding, care, housing, raising a calf, etc., precede chapters on fresh cow troubles, digestive trouble, and common diseases. Many common diseases are mentioned by name and "what to do" written in the simplest language.

The Cow Owner's Handbook may serve as a reference book to the veterinarian's clients, who have recently purchased a cow or calf.

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Dr. John G. Milligan, API '29, has been selected as state veterinarian of Alabama.

The position was opened by a change in the Alabama law separating the offices of state veterinarian and dean of the School of Veterinary Medicine. Both positions previously have been held by Dr. R. S. Sugg.

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The spring pig crop for 1952 is estimated by the Bureau of Agricultural Economics at 56,500,000, a decrease of 9% from last year.

▼

The census of agriculture for 1950 reveals that there were 5,384,000 farms at the beginning of 1950 as compared to a little over 6,000,000 in 1940. Size of farms has increased during the past decade to average 210 acres; an increase of 36 acres for the same period.

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In studies conducted at the Cornell Research Laboratories, information was collected showing that 7% of 2,000 cattle serum specimens gave positive reaction to leptospirosis antigen. These were obtained from widely scattered New York herds.

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The Los Angeles County Livestock Department estimates valuation of livestock production for 1951 as $140,338,300. Cattle were valued at $81,270,060., of which $68,046,160. was assessed for dairy cattle. Poultry ranked second in this livestock evaluation report; all classes totaled $41,223,400.

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Extensive investigations have indicated that benzene hexachloride is effective treatment for sheep scab. A single treatment, by immersion in unheated dip containing 0.06% gamma isomer, not only kills the adult mites, but many eggs, and gives remarkably lasting protection. Sheep dipped in BHC have been exposed to scabby sheep for as long as three months without becoming infested with the scab mite.

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Veterinary immunologists are agreed that if swine are to receive the delayed virus method of immunization for hog cholera, then the best time to administer the virus is between the seventh and tenth days after the administration of the hog cholera antiserum. It is contended that if the virus is given four or five days after the serum has been injected, practically no immunity is established, and if the virus is withheld as long as 14 days, the passive immunity set up by the serum has lapsed and cholera might develop from the virus injection.

Artificial insemination associations have increased in numbers from seven in 1939 to 1,653 in 1951.

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Infertile cows cost the American cattle industry approximately $500,000,000. annually in lost calves and reduced milk production of dairy cows.

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Preliminary and unconfirmed reports tabulated from cards supplied practitioners in Missouri by the Missouri Veterinary Medical Association's Committee on Morbidity and Mortality, indicate surprising incidence of infectious diseases, some of which are communicable to man. The need for such statistical information is apparent in the Committee's report.

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Production of broilers in Georgia for 1951 exceeded that from any other state and passed Delaware, which has been the no. 1 broiler-producing state for the past six years. Increase rated at 5,000% over production of ten years ago and 50% over last year for the state, is credited to large scale methods developed by Jesse D. Jewell, Gainesville.

Poultry Digest for February 1952 refers to Jewell as "The Cackle King" and to the production records as the "Georgia cackling boom."

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"Diagnotions"

There are many self-styled broiler-disease experts advising broiler growers, is the view expressed by *Broiler Growing* (Jan. 1952).

Many of these men have learned how to recognize a number of the more common diseases and also know, through study and experience, how they should be handled from the producer's standpoint. Others are less able.

Laymen are diagnosing poultry disease simply because veterinarians have not been paying much attention to chickens. There are no good reasons for such attitude considering the growth of the poultry industry and the place it now occupies in supplying animal foods.

The poultry industry needs the services of animal disease experts for diagnosis, not handymen for "diagnotions."